CAMBRIDGE SYSTEMATICS

Montgomery Outer Loop Project

Preliminary Traffic and Revenue Study

Final Report

prepared for

Alabama Department of Transportation

prepared by

Cambridge Systematics, Inc.

with

MACTEC Engineering and Consulting, Inc.

October 11, 2006

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100 Cambridge Park Drive, Suite 400
Cambridge, Massachusetts 02140

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1.0 Introduction

The purpose of the Montgomery Outer Loop is to provide congestion relief to existing urban interstates and principal arterials in the southeast quadrant of the region by providing an alternate route for travel through the metropolitan area. In particular, this corridor is intended to reduce traffic on I-85, I-65 south of I-85, the existing loop of U.S. 231/U.S. 80/82, U.S. 331, and SR 271. The facility will provide a more direct route of travel between I-85 north and I-65 south, will improve intermodal connectivity with the Regional Airport and major industrial/trucking facilities, and can potentially serve as the first phase of a proposed extension of I-85 westward to connect with I-20/I-59 near the Mississippi State Line.

The Montgomery Outer Loop has been under study for a number of years. A Final Environmental Impact Statement (EIS) for the project was approved by the Federal Highway Administration (FHWA) on June 5, 1996. The project is included in the Montgomery Metropolitan Planning Organization's (MPO) Year 2030 Cost Feasible Plan, with toll funding as the primary source of revenue for project implementation. Lack of conventional funding led the Alabama Department of Transportation (ALDOT) to initiate this Preliminary Traffic and Revenue Study of the Montgomery Outer Loop in 2005. The consultant team of MACTEC Engineering and Consulting, Inc. and Cambridge Systematics, Inc. was selected by ALDOT to conduct this study.

Section 2.0 of this report, Project Description, provides a summary of the Outer Loop Project including its geographic location in the Montgomery area, a brief overview of the major highway facilities in the area, and a summary of current and future projects included in the Highway Improvement program.

Section 3.0, Traffic Characteristics, includes discussion on traffic trends and the results of the travel time origin and destination study.

Section 4.0, Economic Analysis, provides a review of the economic characteristics of Montgomery and the project corridor.

Section 5.0, Model Development, includes a brief discussion of base year model refinement and validation and network development.

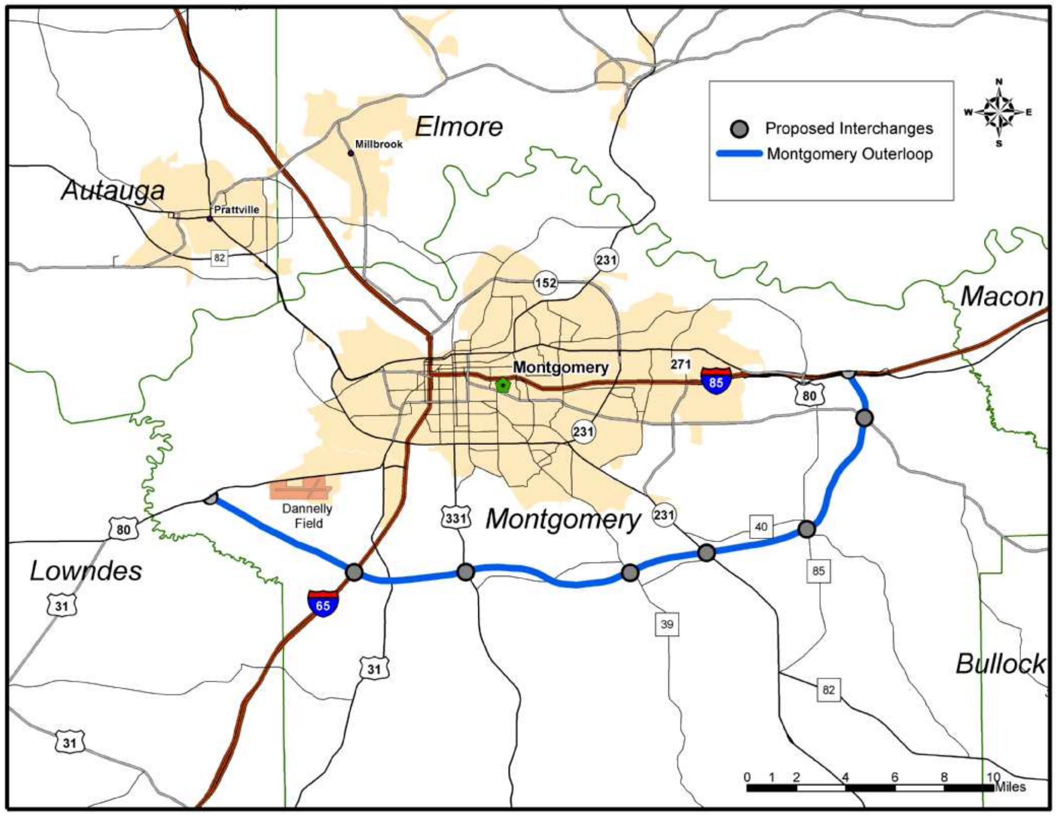
Section 6.0, Traffic and Revenue Analysis, includes discussion on the proposed toll configuration, toll sensitivity analysis, and traffic and revenue forecasts for four scenarios.

2.0 Project Description and Regional Transportation System Context

2.1 PROJECT DESCRIPTION

The Montgomery Outer Loop is a proposed limited access highway in the south and east areas of Montgomery. This two- to four-lane facility would have interchanges with Interstate 85 (I-85) to the east of downtown Montgomery, and at State Route 110 (SR-110), County Road 85 (CR-85), U.S. Route 231 (U.S. 231), CR-39, U.S. 331, and I-65 to the south of downtown, and with U.S. 80 west of Montgomery Regional Airport (see Figure 2.1) The interchanges with I-65 and I-85 would be high-speed freeway-to-freeway interchanges. The facility would be grade separated and have free flow speeds equivalent to or exceeding the existing Interstate network in the region.

Figure 2.1 Outer Loop Project Location Map



Source: Alabama Department of Transportation

2.2 Existing Highway System

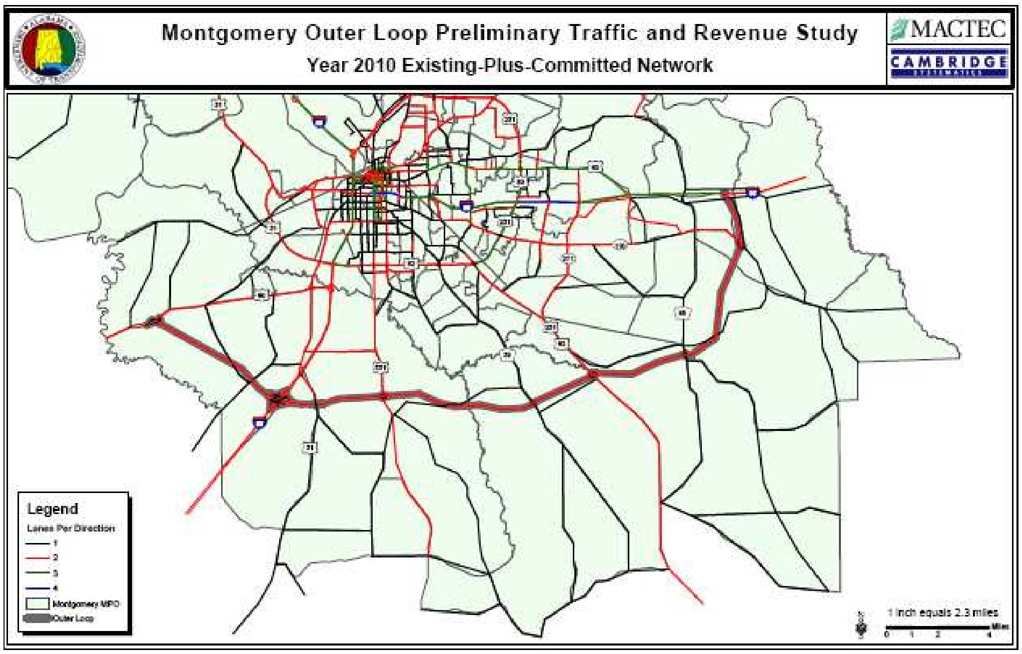
The Montgomery region has two Interstate highways: I-65 and I-85. There is also an existing loop highway, part of which is a grade-separated expressway consisting of U.S. 80/82 (South Boulevard), U.S. 80/231 (East Boulevard), and SR 152 (North Boulevard). Other major arterials in the study area include U.S. 31, U.S. 331, SR 271, and SR 110. Collector roads in the study area include CR 85 and CR 39 (Woodley Road).

2.3 Highway Improvement Programs

Projects that were completed since the base year of the Montgomery MPO's travel demand model (2000) as well as projects found in the MPO's Transportation Improvement Program such as road widening, new facilities, and other capacity improvements were assumed to be in place when the Outer Loop alternatives were analyzed (see Figure 2.2 and Table 2.1).

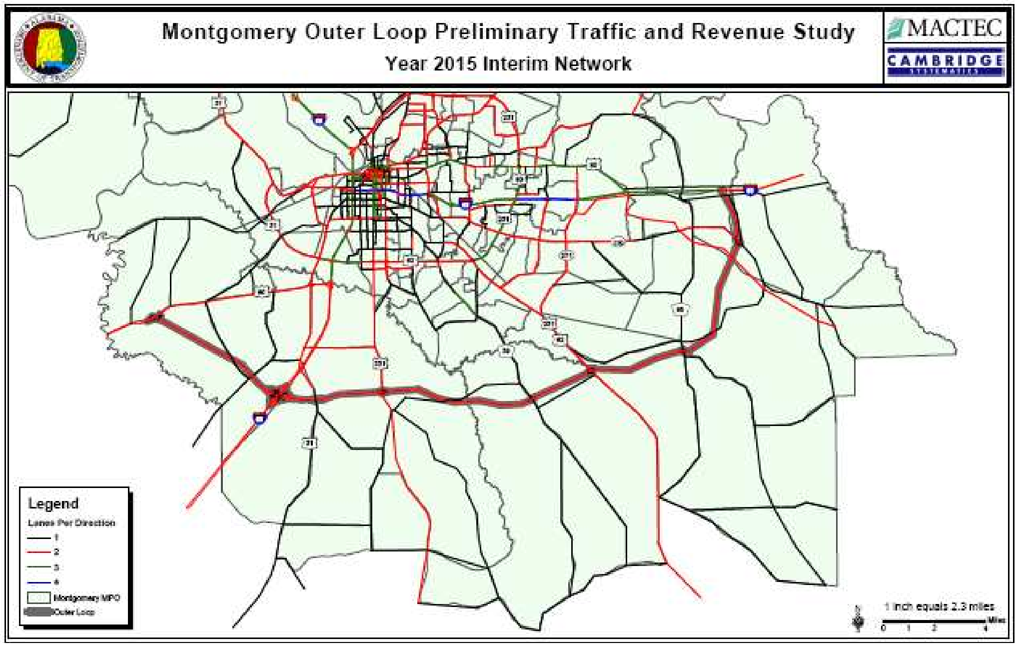
Since the project will take some years to develop, we assumed additional roadway improvements would be complete by 2015 and others would be complete by 2030. The assumption regarding which projects would be completed by 2015 was obtained from the MPO's Financially constrained plan which categorized improvements into two separate timeframes; 2006-2015 and 2016-2030. These projects are depicted in Figures 2.3 and 2.4, and further described in Tables 2.2 and 2.3, divided into two network implementation phases (2015 and 2030).

Figure 2.2 Existing-plus-Committed Highway Network



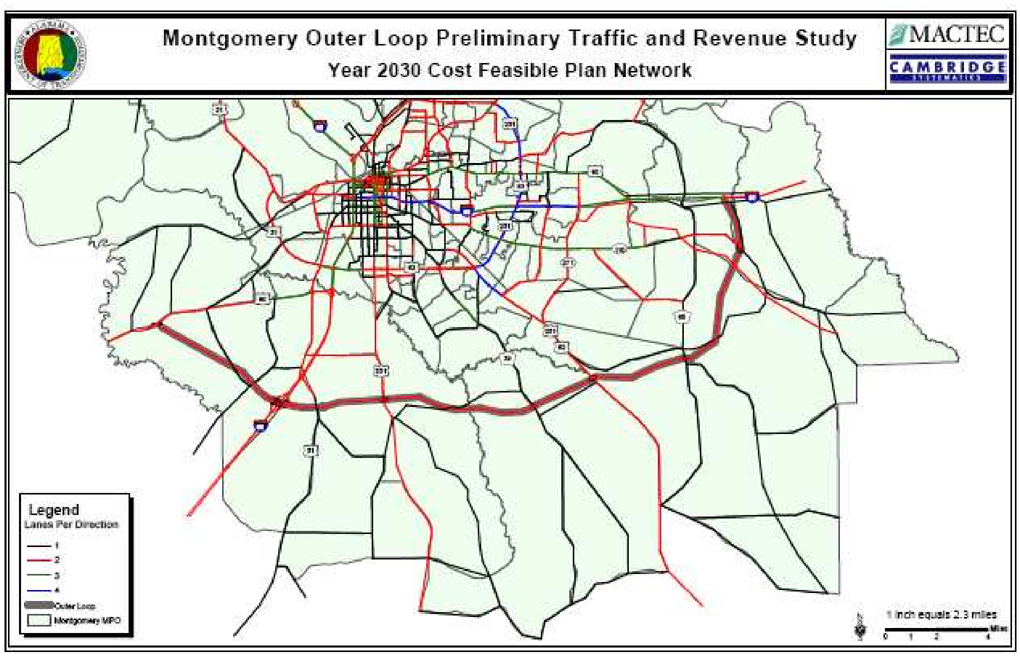
Source: Montgomery Area Metropolitan Planning Organization (MPO).

Figure 2.3 2015 Interim Highway Network



Source: Montgomery Area Metropolitan Planning Organization (MPO).

Figure 2.4 2030 Financially Constrained Network



Source: Montgomery Area Metropolitan Planning Organization (MPO).

Table 2.1 Montgomery Area MPO Existing-plus-Committed Projects

Project	Road	From	To	Description	County
A-1	East Main Street	West of Adell St	Shady Oak Lane	Add Lanes	Autuaga
A-2	U.S.-82	SR-14	SR-206/U.S.-82	Widen to Four Lanes	Autuaga
ME-4	I-65	North Blvd	SR-14	Widen to Six Lanes	Montgomery/Elmore
E-5	SR-14	Calloway Creek	Junction of SR-212	Widen to Four Lanes	Elmore
E-6	U.S.-231(SR-9)	Charles Ave	Knight St	Add Turn Lanes, Safety	Elmore
M-7	U.S.-231	Old Wetumpka Hwy	County Line	Widen to Six Lanes	Montgomery
M-8	U.S.-80 (Atlanta Hwy)	West of East Blvd	Taylor Road	Widen to Six Lanes	Montgomery
M-9	Monticello Drive	East Blvd	Greystone Dr	Widen to Three Lanes	Montgomery
M-10	Perry Hill Road	Harrison Road	U.S.-80 (Atlanta Hwy)	Widen to Five or Six Lanes	Montgomery
M-11	Perry Hill Road	Interstate Park Dr	Harrison Road	Widen to Five Lanes	Montgomery
M-12	Carmichael Road	Perry Hill Road	Woodmere Boulevard	Widen to Five Lanes	Montgomery
M-13	Ann Street	Highland Ave	I-85 On/Off Ramps	Widen to Five Lanes-Private	Montgomery
M-14	Zelda Road	Ann Street	Carter Hill Road	Widen to Five Lanes	Montgomery
M-15	McGehee Road	Carter Hill Road	Governors Drive	Add Turn Lanes	Montgomery
M-16	Bell Road	Norris Farms Road	I-85 Bridge	Widen to Five Lanes	Montgomery
M-17	Relocated Chantilly Pkwy	U.S.-80 (Atlanta Highway)	SR-110	New Four Lane Divided	Montgomery
M-18	East Chase Parkway	Taylor Road	Chantilly Parkway	New Five Lane – Private	Montgomery
M-19	U.S.-80(SR-8)	I-85 Interchange	SR-110 1 half mile	Relocate Interchange	Montgomery
M-20	Hyundai Blvd	U.S.-31/Mobile Hwy	U.S.-331	Widen to Four Lanes	Montgomery
M-21	U.S.-31(Mobile Hwy)	U.S.-80/Selma Hwy	Hyundai Blvd	Widen to Four Lanes	Montgomery
M-22	U.S.-31(Mobile Hwy)	Hyundai Blvd	Curtis Road	Widen Bridges / Approaches	Montgomery
M-23	Montgomery Outer Loop	From I-85 West of SR-203	U.S.-80/Selma Hwy	New Four Lane Freeway	Montgomery
M-24	U.S.-331	1 Mile South of CR-118	Snowdoun	Widen to Four Lanes	Montgomery
M-25	U.S.-331	LeGrande	1 Mile South of CR-118	Widen to Four Lanes	Montgomery
M-26	Taylor Road	AUM Water Tower	U.S.-80/Atlanta Highway	Widen to Four Lanes	Montgomery
M-27	Vaughn Road (SR-110)	Chantilly Parkway	Outer Loop Interchange	Widen to Five Lanes	Montgomery
M-28	I-65	Fairview Ave	Alabama River	Widen to Six Lanes	Montgomery
M-29	I-65	Fairview Ave	U.S.-80/Selma Hwy	Widen to Six Lanes	Montgomery
M-30	I-65	Bell Street	North Blvd (SR-152)	Widen to Six Lanes	Montgomery
M-31	U.S.-80(Atlanta Highway)	Mountainview Drive	East Blvd/SR-152	Widen to Six Lanes	Montgomery
M-32	West Blvd/SR-152	Sylvest Drive	Birmingham Hwy/U.S.-31	Widen to Four Lanes	Montgomery
M-33	U.S.-80(Atlanta Highway)	Brown Springs Rd	I-85 Interchange	Widen to Six Lanes	Montgomery
M-34	I-85	1.5 Miles East of Taylor Rd	Outer Loop Interchange	Widen to Six Lanes	Montgomery
M-35	I-85 at Eastern Blvd	Interchange	Interchange	Widen to Six Lanes	Montgomery
E-36	U.S.-231(SR-9)	Redland Rd/CR-8	CR-200 & Welcome Center	Widen to Six Lanes	Elmore

Source: Montgomery Area Metropolitan Planning Organization (MPO).

Table 2.2 LRTP Highway Improvement Projects Through 2015

Route	From	To	Improvement	County	Potential Funding Source
U.S. 82	SR 206	SR 14	Widen to four lanes	Autauga	NHS
U.S. 82	SR 14	U.S. 31	Widen to four lanes	Autauga	NHS
SR 14	U.S. 31	W. of McQueen Smith Road	Relocation	Autauga	NHS
McQueen Smith Road	U.S. 31	Cobbs Ford Road	Widen to four lanes	Autauga	STPOA
SR 9 (U.S. 331)	CR 8 (Red land Road)	Near CR 200	Widen to six lanes	Elmore	NHS
SR 14	Calloway Creek	JCT of SR 212	Widen to four lanes	Elmore	STPAA
I-65	Bell Street	SR 152 (Northern Boulevard)	Widen to six lanes	Montgomery	NHS
I-65	Fairview Avenue	The Alabama River Work	Widen to six lanes	Montgomery	NHS
SR 9 (U.S. 331)	South of SR 94	LeGrand	Widen to four lanes	Montgomery	NHS
I-85	1.5 miles east of SR 271	Outer Loop Interchange	Widen to six lanes	Montgomery	NHS
SR 3 (West Boulevard)	Sylvester Drive	CR 235	Widen to four lanes	Montgomery	NHS
SR 8 (U.S. 80)	Brown Springs Road	I-85 Interchange	Widen to six lanes	Montgomery	STPAA
Bell Street (CR 235)	Washington Ferry Road	CSXT Railroad Bridge	Widen to four lanes	Montgomery	STPAA
SR 110	CR 137 (Vaughn Road)	Outer Loop	Widen to four lanes	Montgomery	STPAA
SR 8 (U.S. 80)	I-65	SR 9 (U.S. 331)	Extension – four lanes	Montgomery	STPAA
SR 110	CR 85 (Pike Road)	South of Cecil	Relocation	Montgomery	STPAA
SR 110	0.6 miles west of Merry	CR 85 (Pike Road)	Relocation	Montgomery	STPAA
CR 43 (Bell Road)	Old Leeds Road	South End I-85 Bridge	Widen to four lanes	Montgomery	STPOA
CR 43 (Bell Road)	SR 6 (U.S. 82)	Chaparral Drive	Widen to four lanes	Montgomery	STPOA
CR 43 (Bell Road)	Vaughn Road	Chaparral Drive	Widen to four lanes	Montgomery	STPOA
Perry Hill Road	Harrison Road	CR 255 (Atlanta Highway)	Widen to four lanes	Montgomery	STPOA
Ann Street	Highland Ave	Atlanta Hwy (U.S. 80)	Widen to five lanes	Montgomery	STPOA
Wares Ferry Road	East Boulevard	McLemore Road	Widen to four lanes	Montgomery	STPOA
McGehee Road	Governors Drive	Carter Hill Road	Widen to four lanes	Montgomery	STPOA
Montgomery Outer Loop	U.S. 80	I-85	New four lane	Montgomery	

Source: Montgomery Area Metropolitan Planning Organization (MPO).

Table 2.3 LRTP Highway Improvement Projects 2016-2030

Route	From	To	Improvement	County	Potential Funding Source
Prattville Northern Bypass	SR 14 and Old Farm Lane	U.S. 31 North	New four lane arterial	Autauga	STPAA
U.S. 231 North	River Oaks Drive	Near CR 200	Widen to six lanes	Elmore	NHS
SR 14	SR 143	Coosada Road	Widen to five lanes	Elmore	STPAA
Old Farm Lane	Cobbs Ford Rd	SR 14	Widen to four lanes	Elmore	STPAA
SR 14	Coosada Road	Calloway Creek	Widen to four lanes	Elmore	STPAA
New urban connector	CR 7	SR 14	New two lane connector	Elmore	STPOA
New urban connector	CR 7	U.S. 31	New two lane connector	Autauga-Elmore	STPOA
I-85 North	Ann Street	Perry Hill Road	Widen to eight lanes	Montgomery	NHS
U.S. 231 South	South Boulevard	Bell Road	Widen to eight lanes	Montgomery	NHS
South Boulevard	U.S. 231 South	Rosa Parks Avenue	Widen to six lanes	Montgomery	NHS
U.S. 231	Gunter Park Drive E.	North Boulevard	Widen to six lanes	Montgomery	NHS
Atlanta Highway (U.S. 80)	Perry Hill Road	East Boulevard	Widen to six lanes	Montgomery	NHS
East Boulevard	U.S. 231 North	I-85 North	Widen to eight lanes	Montgomery	NHS
East Boulevard	I-85 North	U.S. 231 South	Widen to eight lanes	Montgomery	NHS
Vaughn Road	Perry Hill Road	East Boulevard	Widen to six lanes	Montgomery	STPAA
Vaughn Road	East Boulevard	Ryan Road	Widen to six lanes	Montgomery	STPAA
Atlanta Highway (U.S. 80)	East Boulevard	Brown Springs	Widen to six lanes	Montgomery	STPAA
U.S. 80 West	U.S. 31 South	Montgomery Regional Airport	Widen to six lanes	Montgomery	STPAA
Widen Bridges at CSX RR	Rosa Parks Avenue	U.S. 31 South	Widen to six lanes	Montgomery	STPAA
Coliseum Boulevard	Federal Drive	Biltmore Avenue	Widen to four lanes	Montgomery	STPOA
Carmichael Road	Woodmere Boulevard	East Boulevard	Widen to six lanes	Montgomery	STPOA
Ray Thorington Road	Vaughn Road	Old Pike Road	Widen to four lanes	Montgomery	STPOA
Ryan Road	Vaughn Road	Chantilly Parkway	Widen to four lanes	Montgomery	STPOA
High Street	Perry Street	Decatur Street	Widen to four lanes	Montgomery	STPOA

Source: Montgomery Area Metropolitan Planning Organization (MPO).

3.0 Traffic Characteristics

3.1 Traffic Growth Trends

Looking into the future, the Montgomery area is expected to continue to show moderate growth in population for at least the next 25 years (see Section 4.0, Economic Analysis). Much of the growth is expected to occur in eastern areas of Montgomery County and in surrounding counties. This growth pattern is expected to increase the number of longer distance commuters traveling to the city's Central Business District (CBD) and other major employment centers along the I-85 and East Boulevard corridors. This growth trend is expected to result in increased congestion on primary regional highways through 2030. Average weekday vehicle-miles traveled (VMT) in the region is expected to increase from 8,873,915 in the 2000 base year to 15,013,427 in 2030. This translates into an average rate of growth of 1.8 percent per year.[1]

These concerns are addressed in the Long-Range Transportation Plan (LRTP) recently adopted by the MPO for a 2030 horizon year, which includes the Montgomery Outer Loop connecting I-85 near the MPO's eastern boundary to I-65 and U.S. 80 at the MPO's western end plus other projects. The Outer Loop is specifically addressing existing and anticipated growth in residential development and retail employment in the eastern areas of Montgomery County. This expansion to the east is coupled with increasing employment opportunities in southern areas of Montgomery County.

3.2 Travel Time Studies

Travel time studies on 12 routes in the region were conducted by the Consultant team to measure current peak and off-peak times along primary highway corridors in the study area. These routes include major competitive facilities to the Montgomery Outer Loop including the I-65/I-85 route through the CBD of Montgomery. Other travel times measured and compared to the base year model, include the Inner Beltway (U.S. 80 and U.S. 231), U.S. 231 between the Inner Beltway and U.S. 82, U.S. 331 from the Inner Beltway to CR 22 (Trotman Road), and Vaughn Road from SR 110 to I-85.

[1] Montgomery Area MPO Travel Demand Model

Table 3.1 Travel Times and Average Speeds

Route	From	To	Distance (miles)	Travel Time (min)		Average Speed (mph)	
				Peak	Off-peak	Peak	Off-peak
I-65/I-85	Tyson Road (exit 158)	SR 8 (exit16 on I-85)	29.5	26.17	26.44	67.6	67.0
U.S. 331	U.S. 80	CR 18	6.0	7.17	7.17	50.2	50.2
CR 39	U.S. 80	CR 22	7.1	10.7	11.1	39.8	38.4
U.S. 231 South	U.S. 80	CR 85	12.7	13.92	12.82	54.7	59.4
U.S. 80/U.S. 231	I-65	I-85	8.7	18.06	18.60	28.9	28.1
U.S. 80	CR 7	I-65	7.9		8.94		53.0
SR 271 Taylor Road	U.S. 231	I-85	5.0	9.50	8.77	31.6	34.2
Pike Road	U.S. 80	U.S. 231	13.5		15.7		51.6
CR 18	U.S. 331	CR 39	5.6		6.10		55.1
CR 22	CR 39	U.S. 231	2.6		2.99		52.2
CR 40/ CR 83 / SR 110	U.S. 231	I-85	16.5		19.08		51.9
Vaughn Road	SR 110	I-85	9.2		16.69		33.1

Source: MACTEC Engineering.

4.0 Economic Analysis

This chapter begins with an analysis of the factors that drive the demand for vehicle trips (truck and car) in Montgomery County. These factors include population, employment, income, and economic structure. Following the analysis of major economic and demographic trends, the report discusses trends in the motor vehicle manufacturing industry which has become one of the key economic drivers of Alabama and the Montgomery area. The success of auto manufacturing in Montgomery County will have a direct bearing on the Outer Loop's traffic volumes as Hyundai and many of its direct suppliers are located nearby the proposed alignment. Also analyzed are recent trends in business site locations and likely future growth patterns in Montgomery County (based on the geographic concentration of large land parcels available for commercial and industrial expansion). Finally, the forecasts of socioeconomic variables used in the travel demand model are shown and discussed.

4.1 Overview

Montgomery's economic development community has concerns about growing congestion in the region, particularly on I-85 in downtown Montgomery and on the roadways that form the "Bypass" (US 80, US 231, SR 152, SR 21, and SR 53). Continued residential and commercial growth is causing these roadways to be safety hazards and congested by economic development officials. The Outer Loop is seen as a solution for relieving the traffic pressure on I-85, I-65, and the Bypass in inner Montgomery County. It might also serve as the first segment of an extension of I-85 from Montgomery to Mississippi, providing better access to Jackson and points westward, including the large Dallas-Fort Worth market.

Residential growth to the southeast and east of Montgomery is leading to higher congestion levels, notably in the area between I-85 and 231. Very large residential communities of about 400 units each are being planned for this area (e.g., off of 110 on Pike Road). Retail activity also is expected to expand east and southeast of the city to serve the residential growth.

While the Montgomery area's residential growth is moving towards the southeast, the establishment of Hyundai off of I-65 south of central Montgomery and the presence of the airport and its industrial parks on U.S.-80 is pushing Montgomery County's commercial and industrial growth to the west and southwest. The proposed Outer Loop would link the fast growing residential areas with the large industrial developments that have sprouted close to the airport and to Hyundai.

4.2 POPULATION

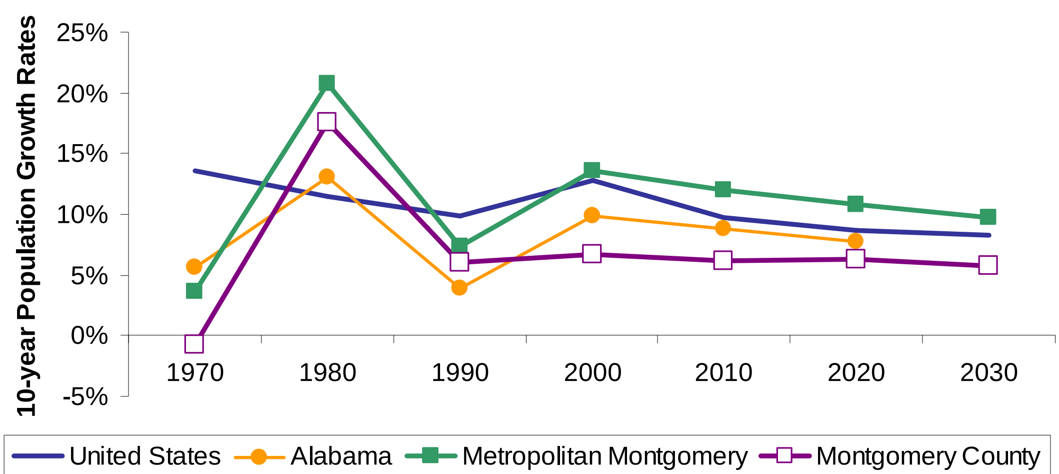
Historic Trends

Population growth has a direct impact on transportation demand. More people take more trips, require more services, and need more goods to sustain themselves. The Montgomery area (Montgomery, Autauga, and Elmore counties) has traditionally grown at a faster pace than the State of Alabama, at times faster and at other times slower than the U.S. rate (see Figure 4.1). The Montgomery area's population reached almost 346,000 in 2005 and has added about 13,000 people since 2000 according to U.S. Census Bureau estimates.

The rate of population growth in the Montgomery area has slowed down since 2000, decreasing from a 1.3 percent average annual growth rate in the 1990s to less than a 0.8 percent annual rate between 2000 and 2005. The decline in the growth rate is likely tied to slower economic growth as the Montgomery area (and the State of Alabama) was hit harder by the 2001-2002 recession than the United States, overall.

Although metropolitan Montgomery is increasing in size, Montgomery County has experienced a slight decline in population in recent years. After recording low-to-moderate growth between 1970 and 2000, Montgomery County's population began to drop in 2000. By 2005, Montgomery County had 1,900 fewer people than at the start of the decade, and Elmore and Autauga counties are accounting for all of the metropolitan area's recent net growth.

Figure 4.1 Long-Term Population Trends – Montgomery Metropolitan Area Compared to the United States and Alabama, 1970-2030



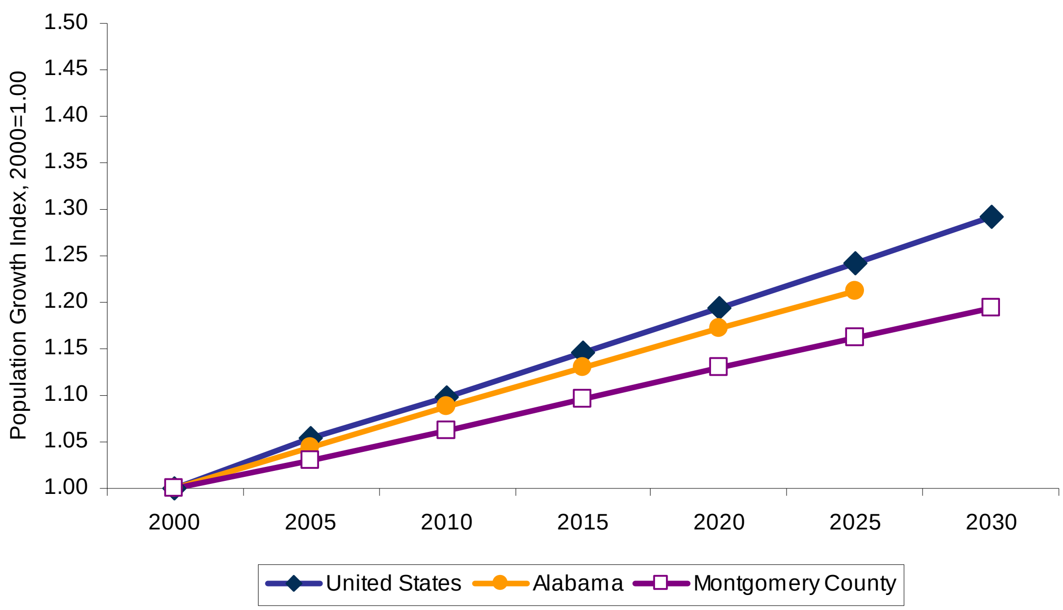
Source: U.S. Census Bureau (historic and U.S. forecast) and Center for Business and Economic Research (Alabama and Metropolitan Montgomery forecasts).

Forecast

By 2030, the three-county Montgomery area is forecast to have 453,000 people according to the Montgomery MPO, more than 100,000 more people than the 2005 Census estimate. The MPO forecast through 2025 is based on the official state forecast from the University of Alabama's Center for Business and Economic Research (CBER). The 2030 projection is an MPO estimate since the CBER projection ends in 2025. According to the CBER/MPO, the Montgomery area is projected to grow at a faster rate (+22.9 percent) than the United States (+17.9 percent according to the Census forecast for the nation) and Alabama (+16.0 percent) between 2000 and 2025.

Similar to historical population trends for the three-county Montgomery area, the CBER predicts that Montgomery County will grow more slowly (+12.8 percent) between 2005 and 2025 than Alabama and the nation (see Figure 4.2). The County is expected to add an additional 36,000 people during the 2005-2030 period, accounting for more than a third of the three-county Montgomery area's total growth.

Figure 4.2 Population Growth Index, 2000 to 2030 (2000=1.00); CBER Growth Projection



Source: U.S. Census Bureau (U.S. forecast) and Center for Business and Economic Research (Alabama, Autauga, Elmore, and Montgomery County Forecasts).

Another forecast by Woods & Poole[2] shows Montgomery County having slightly more people in 2030 (270,000 versus 266,802 for the CBER/MPO). The Woods &

[2] Woods and Poole forecast for Montgomery County

Poole forecast also indicates slightly slower growth for the Montgomery area, overall, but with the County accounting for a higher share of regional growth than shown in the CBER/MPO forecast.

For either the CBER/MPO or Woods & Poole forecasts to have any chance of accuracy, Montgomery County must reverse the trend toward declining population experienced between 2000 and 2005. The CBER/MPO forecast predicted a gain in population for the 2000-2005 time span but that has not occurred. The recovery of the Montgomery region's economy and the growth of the automotive industry may start to result in population gains later this decade. This reversal will need to be confirmed by future data and will need to stay the course in coming decades if the CBER/MPO population forecast for Montgomery County is to be met.

2025 Census Population Projection for Alabama

According to interim state-level population projections released by the Census Bureau in April 2005, Alabama is forecast to have 4.8 million people in 2025, an increase of only 5 percent over 2005. By comparison, the CBER projects that the Alabama population will rise to nearly 5.4 million by 2025, a gain of 16 percent. The CBER increase is close to the estimated rate of increase for the United States (17.9 percent) while the Census projection is substantially lower. Because Montgomery County has historically followed Alabama growth trends (refer back to Figure 4.1), slow population growth in the State could translate into a lower population in Montgomery County in 2025 and 2030 than currently forecast by the CBER and MPO. The Census Bureau's forecast is interim and a revised forecast, once released (date has not been announced as of this writing), will supplant the April 2005 projection. In the meantime, however, the present Census projection should be considered a "low growth scenario" for the State and planners in Montgomery County may wish to take into account the possibility of lower than expected population growth when planning for a potential toll road in the Outer Loop corridor.

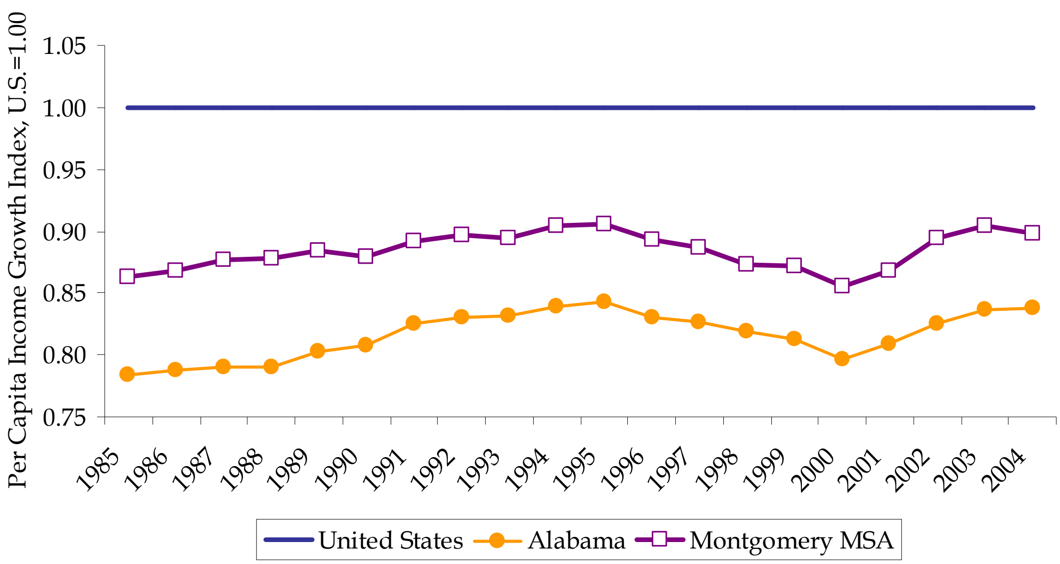
In explaining the discrepancy between the projected growth rate for Alabama and that of the United States, two factors stand out.[3] First, although Alabama is assumed to receive a net inflow of domestic migrants, the State will continue to see a net loss of its younger population (in reproductive age groups) to migration. Second, while the United States will continue to receive a significant number of immigrants, the State of Alabama will receive a relatively small fraction of those.

[3] Observations of Census staff when asked to explain their population forecast for Alabama.

4.3 Income

While the expansion of jobs is a valid proxy of overall economic growth, people ultimately need higher income levels to justify increased consumption. The Montgomery area's per capita income levels have historically been higher than Alabama's, but lower the United States' (see Figure 4.3). The gap in income levels between the United States and the Montgomery area narrowed significantly between 2000 and 2003, but lost a small amount of ground in 2004. However, the expansion of the automotive industry bodes well for future income levels in the Montgomery area as the industry, especially assembly facilities such as Hyundai, pay wages significantly higher than the prevailing regional average. Increases in income will contribute to higher demand in Metropolitan Montgomery for goods and services in coming years, and will likely result in more vehicle movements (car and truck).

Figure 4.3 Metropolitan Montgomery Per Capita Income Growth Index, 1985-2004



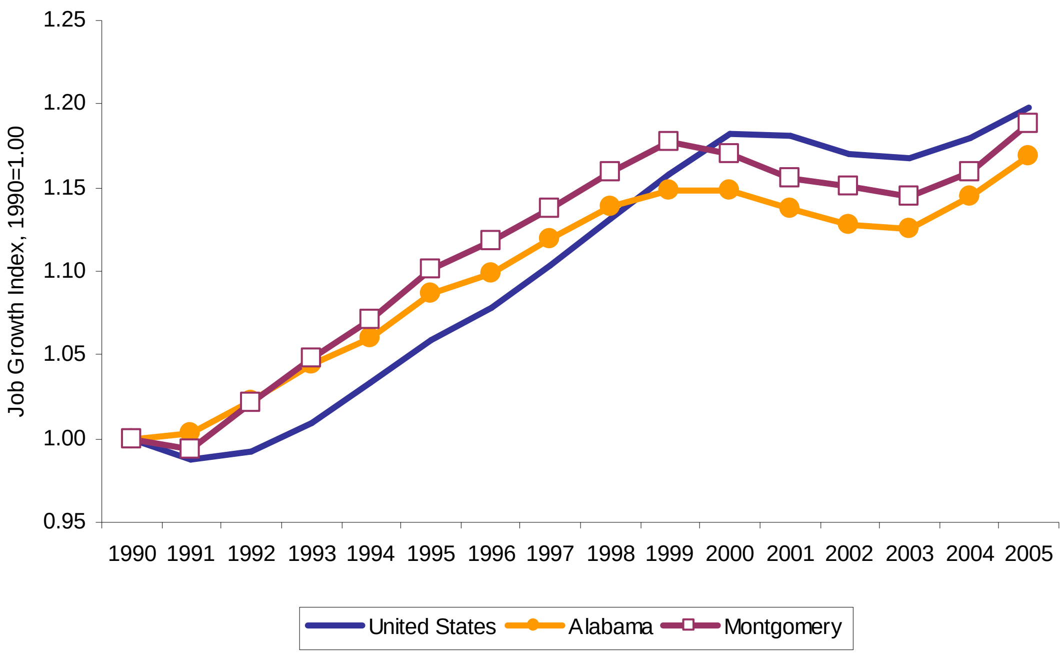
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

4.4 Employment

Historic Trends

During the 1990s U.S. economic boom, Montgomery County and Alabama added jobs at a much faster rate than the U.S. average (see Figure 4.4). Between 1990 and 1999 the number of jobs in Montgomery County grew by almost 23,000 and the county accounted for about nine percent of the state's job gains. Since 2000, however, Montgomery County has endured a sharper recession than the United States overall. The county is now recovering and is seeing resumption in jobs growth. The growth of the automotive industry in the region has led to substantial job gains in 2004 and 2005, but data in coming years will need to be monitored to gauge if Montgomery County has returned to a long-term trend of moderate employment growth (as seen in the county's history and as currently anticipated in the MPO forecast). The expansion of the Montgomery County economy and jobs growth, like population, translates into more commuting trips and a higher demand for a full-range of goods (for consumers and businesses)—resulting in more truck trips.

Figure 4.4 Employment Growth Index, 1990-2005 (1990=1.00)

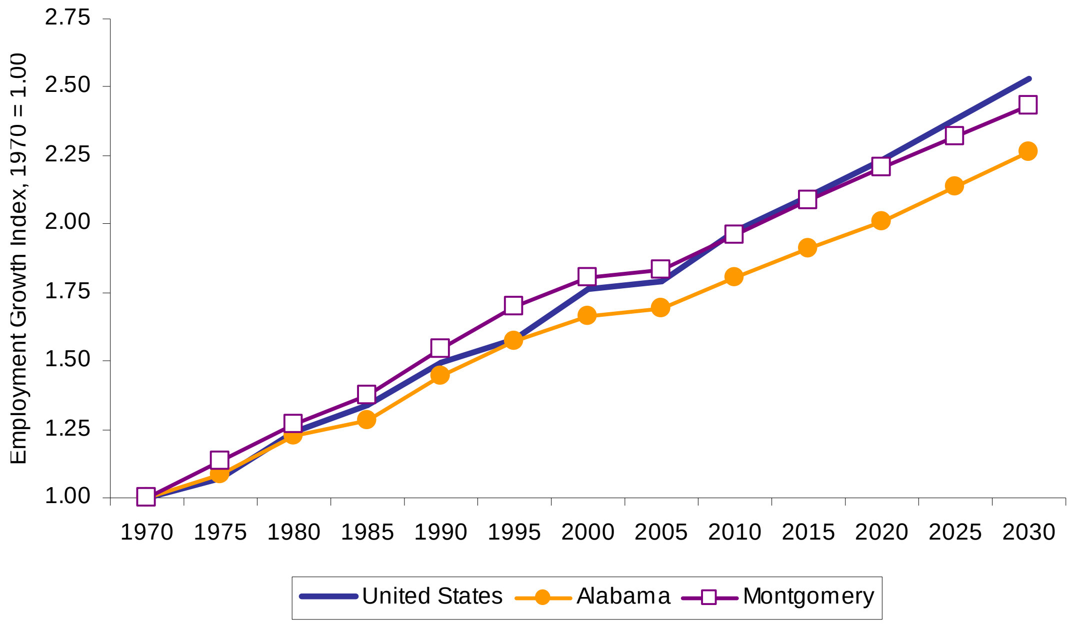


Source: U.S. Department of Commerce, Bureau of Economic Analysis; data for 2005 are estimates.

Forecast

Historically, Montgomery County's rate of jobs growth has tended to follow the U.S. trend (see Figure 4.5). Between 1970 and 2000, the County generally saw employment grow by approximately 20 percent per decade (about 26,000 net new jobs every 10 years). Due to job losses earlier this decade, Montgomery County (according to the MPO forecast) is expected to grow by only 8.5 percent (+14,000 jobs) between 2000 and 2010, a growth rate that would put the county below the U.S. forecast increase (+11.9 percent according to Woods & Poole). The County is likely to meet the 2010 target if it sustains recent growth trends. The MPO forecast has Montgomery County tracking the United States and thereby resuming stronger employment growth between 2010 and 2020. The pace of jobs growth is then forecast to fall somewhat between 2020 through 2030.

Figure 4.5 Historic and Forecast Employment Growth, 1970-2030

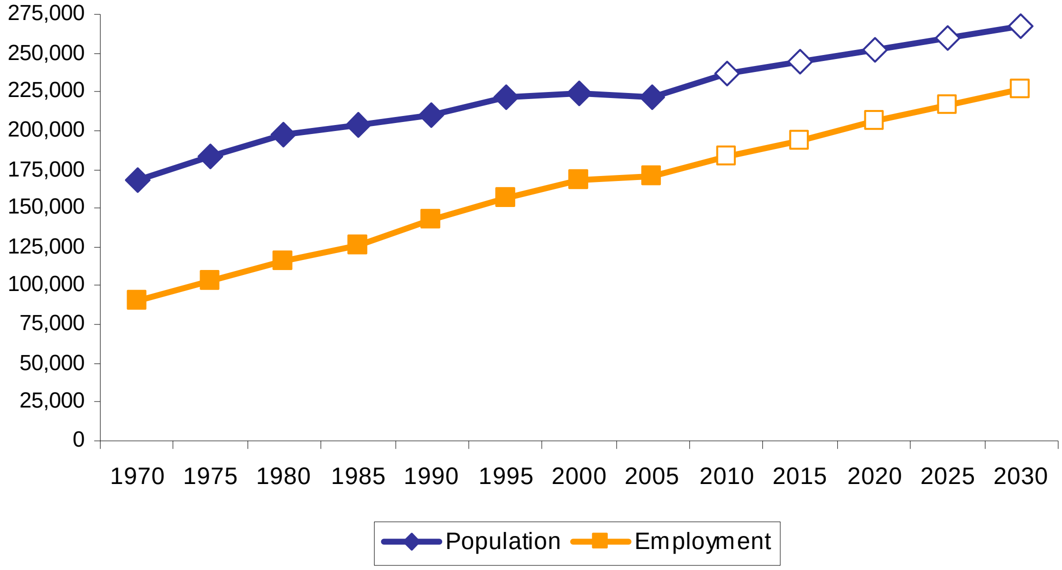


Source: Bureau of Economic Analysis (historic); Montgomery MPO (forecast for three counties); and Woods & Poole forecast for Alabama and United States.

4.5 Montgomery County – Population and Employment Growth Compared

Montgomery County, with its businesses, transportation infrastructure, and state government facilities, is the main employment center for Central Alabama, drawing workers from the surrounding region. Montgomery County has gained jobs at a moderate rate over the decades, a trend that is expected to continue into the future according to both the Montgomery MPO and Woods & Poole forecasts. However, while jobs growth in Montgomery County has been fairly robust, population growth has been considerably slower. In fact, the county lost people between 2000 and 2005 even as employment showed some growth. Montgomery County's population is expected to grow at a much slower rate than employment through 2030 (see Figure 4.6). Long-term, the number of people working in Montgomery County is converging on the number of people living in the county. With its large and diverse employment base, it is possible that Montgomery County may some day have more workers than residents. Today, counties such as Fulton (Atlanta) in Georgia have more employees than population. Jefferson County, Alabama (Birmingham) is showing a similar trend as Montgomery (employment growing at a faster rate than population).

Figure 4.6 Employment Levels in Montgomery County Are Expected to Increase Faster than Population

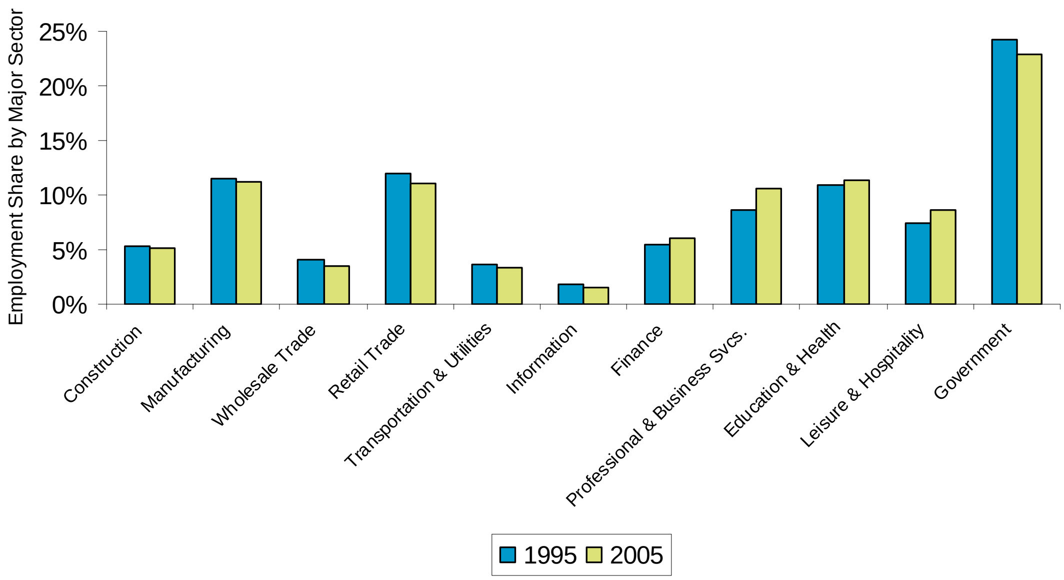


Source: U.S. Census Bureau, Bureau of Economic Analysis, Woods & Poole, and Montgomery MPO (forecasts).

4.6 Economic Structure

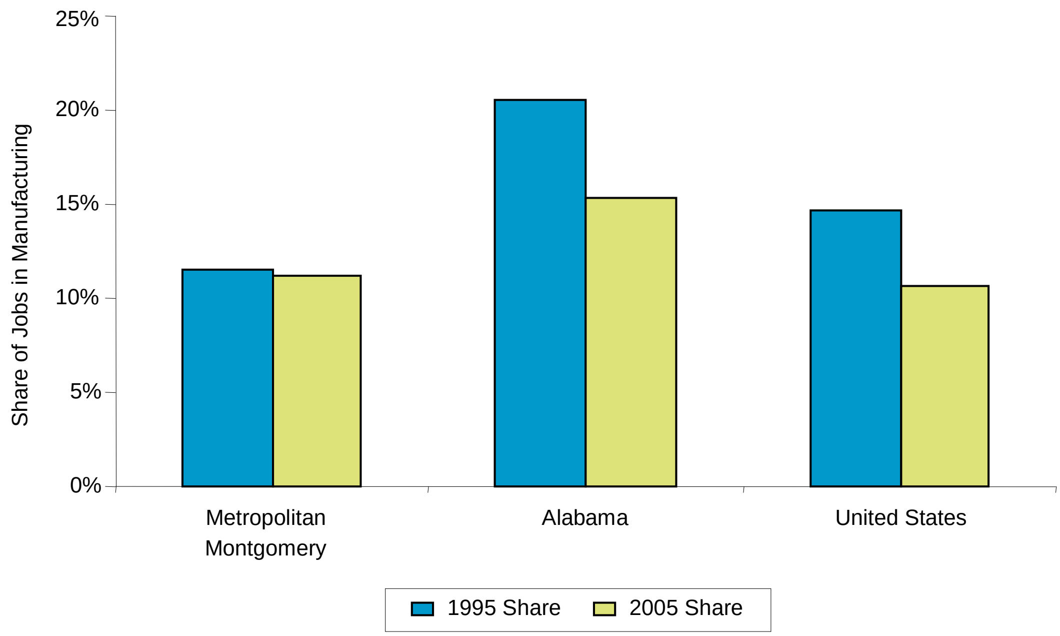
The most distinguishing change in the Montgomery area's economic structure over the past 10 years is not the growth of the professional and business services industry, a nationwide trend, but the relative stability of the region's manufacturing sector (see Figure 4.7). Between 1995 and 2005, the Montgomery area *added* nearly 2,000 manufacturing jobs while the nation and Alabama lost significant portions of their manufacturing employment. The Montgomery area's gain was sufficient to keep manufacturing at over 11 percent of total regional employment in both 1995 and 2005. By comparison, the share of U.S. and Alabama jobs in manufacturing declined precipitously (see Figure 4.8). The Montgomery area's success in maintaining its manufacturing sector is due to the recent emergence of the automotive industry as a major component of the region's economy. Without this growth, the trend in the Montgomery area would have been similar to the statewide and U.S. trends (i.e., a marked drop in manufacturing's share of regional employment).

Figure 4.7 Change in Employment Shares by Major Economic Sector – Metropolitan Montgomery, 1995-2005



Source: Bureau of Labor Statistics.

Figure 4.8 Share of Jobs in Manufacturing – Metropolitan Montgomery Compared to Alabama and U.S., 1995-2005



Source: Bureau of Labor Statistics.

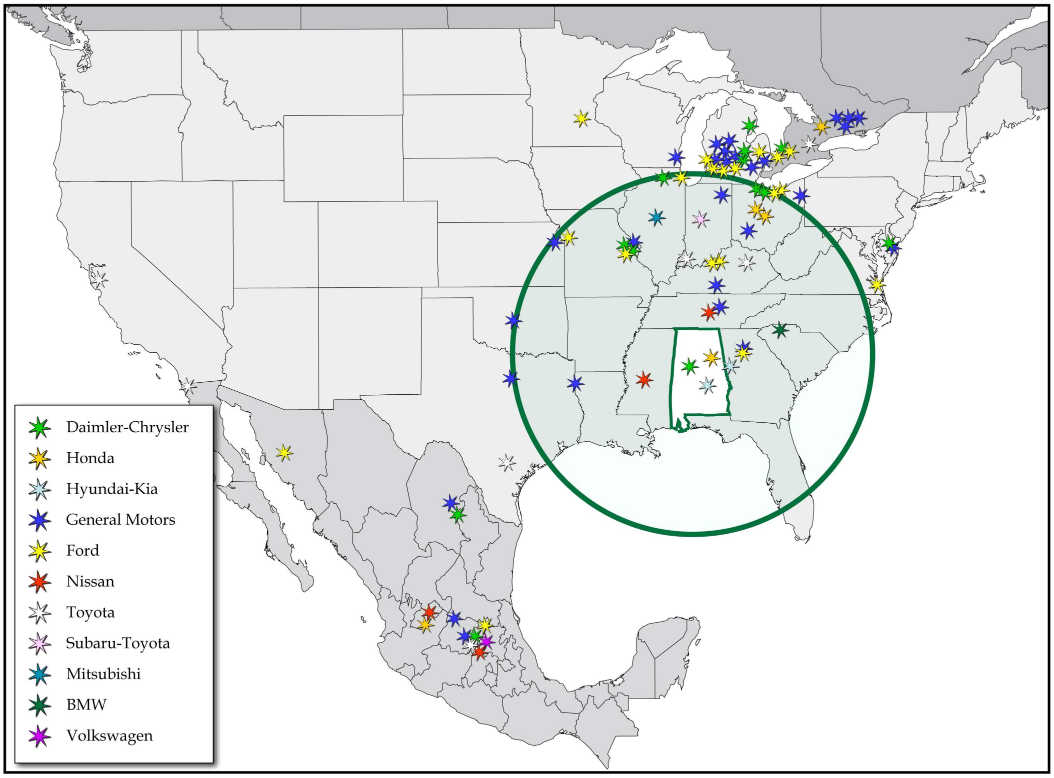
Growth of the Automotive Industry

The Montgomery Area's strength in manufacturing jobs is primarily due to the automotive industry and Hyundai's decision to locate a very large assembly plant southwest of the City of Montgomery. This decision is part of a larger trend that is seeing the U.S. South become a new center of the North American car and truck industry, an evolution that is bringing significant growth and economic opportunities to Alabama and Montgomery County.

The growth of Ford, General Motors, and Chrysler in the Detroit area established the Midwest as the hub of the United States automotive industry in the first half of the 20th century. Although the Midwest maintains this role today (see Figure 4.9), in the past 25 years a variety of factors including lower cost structures and the emergence of foreign-makers as major forces in the U.S. marketplace has contributed to a shift in the industry towards the South. Beginning in the 1980s with Nissan in Tennessee, Toyota in Kentucky, and later with BMW in South Carolina, the South has become the preferred location for new foreign automobile assembly plants in the United States.

Alabama has become the greatest beneficiary of the geographical tilt of the U.S. automotive industry towards the South. Although the State did not capture the initial wave of automotive investments, it has won a series of major expansions from Mercedes Benz, Honda, and Hyundai since 1992. These, combined with the opening of a new Nissan facility in Mississippi and the announcement by Kia to build an assembly plant on the Georgia-Alabama border, serve to strengthen Alabama's position as a producer of automobiles and automotive parts. Figure 4.9, showing the locations of all North American assembly plants as of early 2006, demonstrates that Alabama is now at the center of Southern automotive production – the primary growth region for the U.S. motor vehicle industry.

Figure 4.9 North American Auto Assembly Plants, 2006



Source: Automotive News.

Alabama's first automotive plants, built by Mercedes Benz in Vance and Honda in Lincoln, were located in the northern part of the State, both within 40 miles of the populous Birmingham area, the traditional industrial seat of the State. Hyundai's 2002 decision to locate an assembly plant southwest of Montgomery marked the beginning of a wave of new automotive-related jobs and suppliers for Montgomery County and Central Alabama. Between 2003 and 2005, Montgomery County added 4,047 automotive jobs, far more than any other county in the State (see Table 4.1). The growth of Hyundai and its suppliers (43 suppliers have located in Montgomery County and surrounding areas to serve Hyundai) over the past few years has established Montgomery as a center for motor vehicle manufacturing, a role that the county had not held previously.

Table 4.1 Alabama Counties Ranked by Number of Automotive Jobs, 2005

	2003	2005	Net Change	Percent Change
Tuscaloosa	5,291	7,854	2,563	48.4%
Talladega	4,002	6,001	1,999	50.0%
Madison	4,207	4,866	659	15.7%
Montgomery	**634**	**4,681**	**4,047**	**637.3%**
Limestone	2,885	2,812	-73	-2.5%
Lee	2,004	2,322	318	15.9%
Etowah	2,026	2,197	171	8.4%
Alabama	31,197	44,834	13,637	43.7%

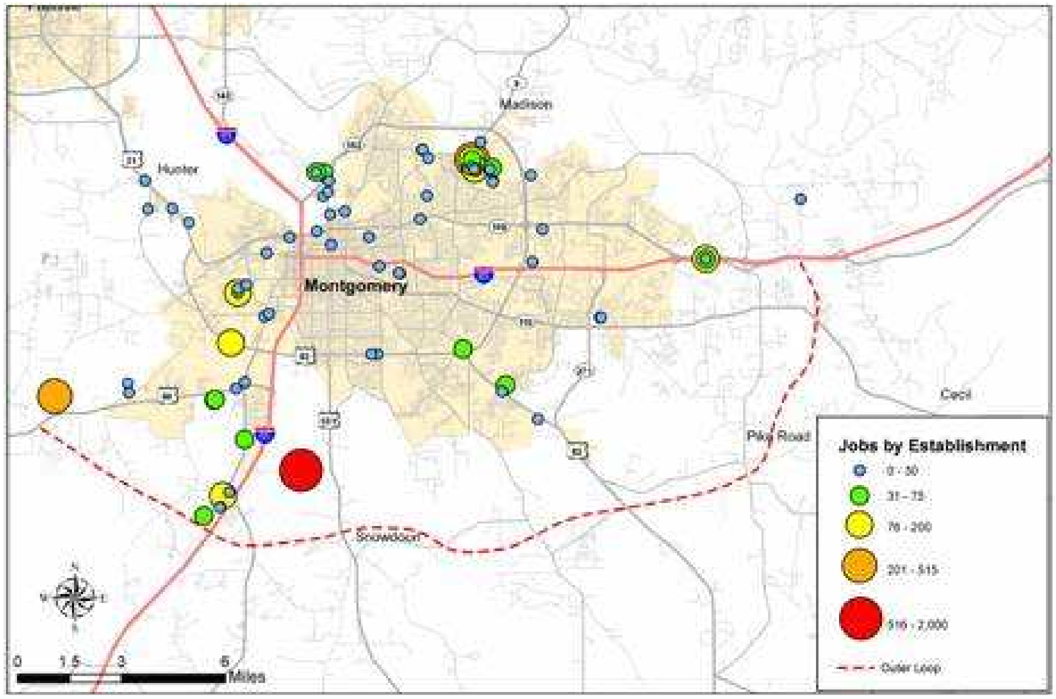
Source: Alabama Automotive Manufacturers Association, "2005 Auto Industry Survey," February 2006.

Hyundai's Montgomery County location, east of I-65, to the southwest of the city is very close to the planned alignment of the Outer Loop. The plant is a major activity center for the area, generating significant numbers of truck (for supplies and finished vehicles) and commuter trips. Freight carriers and employees would be likely beneficiaries of the Outer Loop. On a daily basis, the plant is served by approximately 1,000 truck trips, carrying automotive parts on inbound trips and transporting market-ready vehicles on outbound trips. Hyundai's auto assembly plant has 3,000 employees and nearly all of them must reach the facility by car. Hyundai has more land than it needs to handle the operations of its assembly plant. There is an expectation that Hyundai will use this land for further expansions in the future. Any expansion of production and jobs will translate into more truck and car trips in southwestern Montgomery County and would add to potential traffic volumes on the proposed Outer Loop.

Many of Hyundai's suppliers, such as Hyundai-Mobis at the airport industrial park on U.S. 80, are also concentrated nearby the assembly plant. These suppliers have their own logistics needs and are large-scale employers in the region. The Outer Loop would provide suppliers with a more direct route to the Hyundai assembly plant. Kia's recently announced plant in West Point, Georgia, only 80 miles away on I-85, will be sharing several of the same suppliers as Hyundai. In order to meet Kia's demand for automotive parts Hyundai's Montgomery-area suppliers are expected to expand. With many of these supplier plants choosing to build south of Montgomery (in the county as well as in Lowndes, Butler, Crenshaw, and Monroe Counties), the Outer Loop would provide an alternative route to connect I-65 with I-85, bypassing downtown Montgomery. The opening of the Kia plant is likely to generate hundreds (rough estimate) of new truck trips in Montgomery County – trips that would go through downtown Montgomery's Interstates if the Outer Loop is not available as an option.

Recent Expansions and Major Building Sites in Montgomery County

Figure 4.10 Expansions and Relocations in Montgomery County, 1999-2004

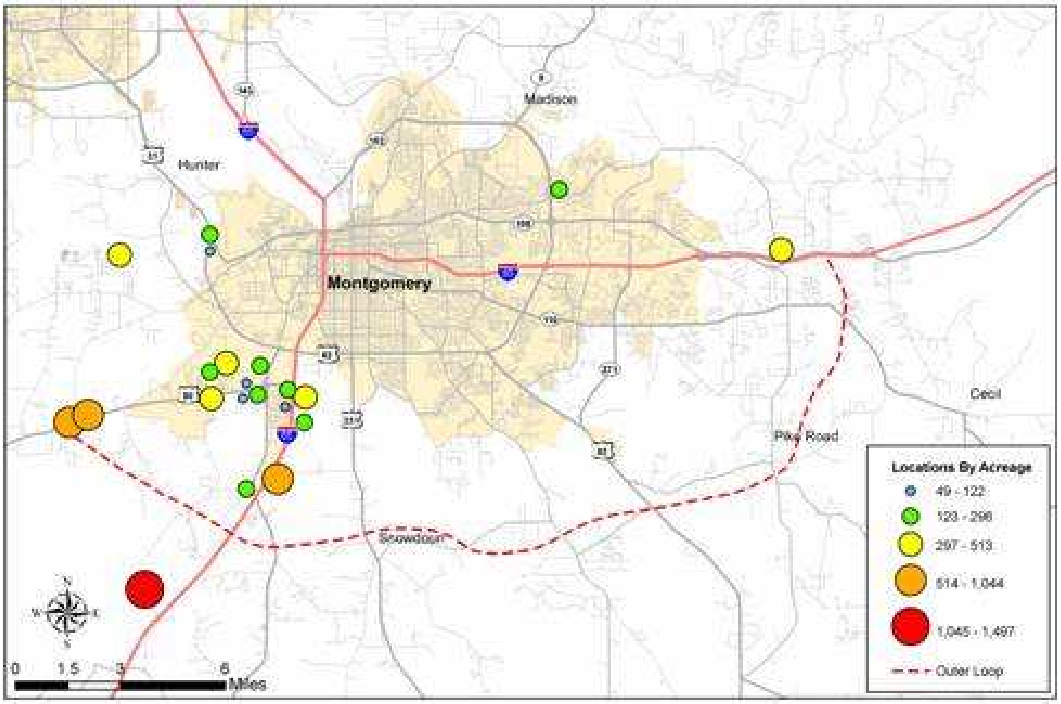


Source: Alabama Development Office; map prepared by Cambridge Systematics.

Recent Business Expansions and Site Locations

The Alabama Development Office, the lead economic development agency for the State, maintains a database of major business expansions covering the 1999 to 2004 period. Figure 4.11 pinpoints the locations of these expansions. Although business expansions are dispersed throughout Montgomery County, there is a distinct cluster of activity on the northeast side of the City of Montgomery and a significant number of larger expansions located in an area to the southwest of the city that would be affected directly by the proposed Outer Loop. This includes Hyundai, the largest business expansion ever to take place in Montgomery County, and a major expansion by an automotive supplier nearby the airport – a part of the county that is anticipating significant business growth in coming years.

Figure 4.11 Major Available Building Sites in Montgomery County, 2006



Source: Alabama Economic Development Partnership; map prepared by Cambridge Systematics.

Major Sites Available for Business Expansion in Montgomery County

The Alabama Economic Development Partnership (a non-profit organization led by the Alabama business community), as part of its efforts to encourage business expansions in the State, maintains a database of large buildable properties (larger than 20 acres) throughout the State. For each site, the database includes detailed information about available transportation (rail and highway) infrastructure and water/wastewater services. The availability of this type of information removes some of the guesswork that companies considering an Alabama site may have, and may benefit the State as it competes with others for new business. In Montgomery County, large properties available for new office, commercial, or industrial construction are overwhelmingly located to the southwest of the city, nearby the Hyundai plant and the airport. These sites, once built-out, have the potential to employ tens of thousands of people and signify that much of Montgomery County's future jobs growth is likely to be concentrated in an area that would be served by the proposed Outer Loop. Many of these sites are already prepared for construction (i.e., roadway, water, and sewer connections are in place) or are currently under development.

Development of the Airport Area

Land in the vicinity of the Montgomery Regional Airport and nearby the likely alignment of the Outer Loop is an area planned for significant future business growth in Montgomery County. Evidence of this trend can already be seen in the site location and available building site concentrations in the figures shown previously. This trend is further supported by $40 million in improvements to the airport that is expected to result in new air services as well as by the development of the Airport Industrial Park to accommodate business growth. The improvements have already helped to attract a global logistics company, Panalpina, to the area and more companies (in logistics and other industries) are expected in the future. Hyundai-Mobis, a major supplier to Hyundai has built a 430-person manufacturing plant at Airport Industrial Park off of U.S. 80. The Airport Industrial Park has the capacity (1,000 acres) to attract significant additional business growth to the area.

The airport, with its expansion of passenger and cargo services, combined with the building of new commercial and industrial facilities at nearby industrial parks, is a growth node for Montgomery County. The development of the Outer Loop, according to local economic development officials, would provide improved access to the airport area and would benefit the manufacturers locating at the industrial parks.

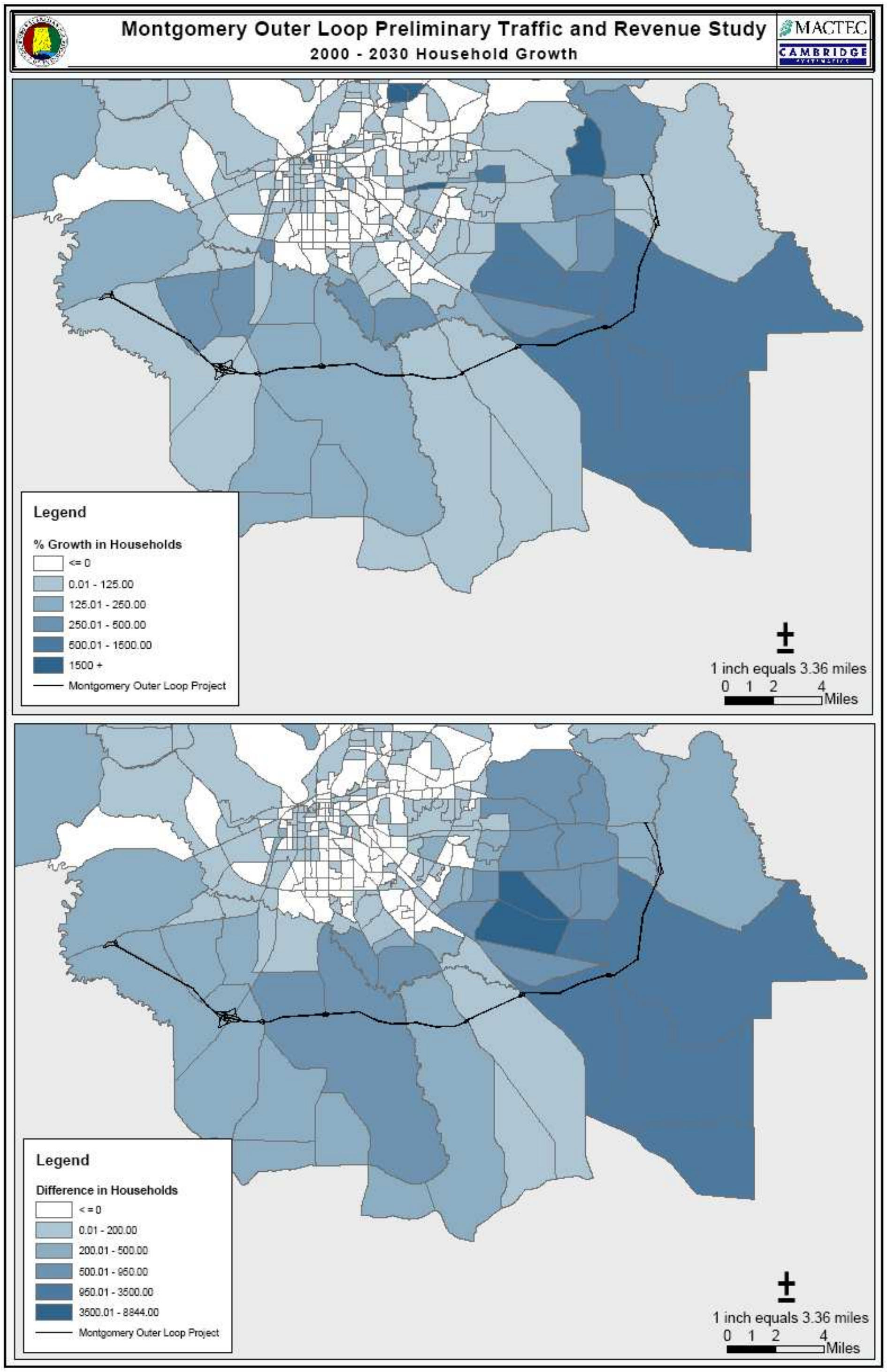
Socioeconomic Forecasts in the Travel Demand Model

Like any regional travel demand model, the Montgomery regional model uses socioeconomic data to estimate the quantity and location of future person trips and their distribution around the region. The Montgomery MPO travel demand model has forecasts for 2000 and 2030 which formed the basis for the traffic forecasts described in Section 6.0.

Figure 4.12 displays the patterns for expected household growth from 2000 to 2030. The darker the color, the higher the forecast of expected growth and growth is shown both in number of households and in percentage increases. The southeast area of Montgomery is forecasted to have the greatest growth in new housing which is consistent with the development that is currently taking place in this area. The zones along the project corridor are also expected to capture a significant amount of the new growth.

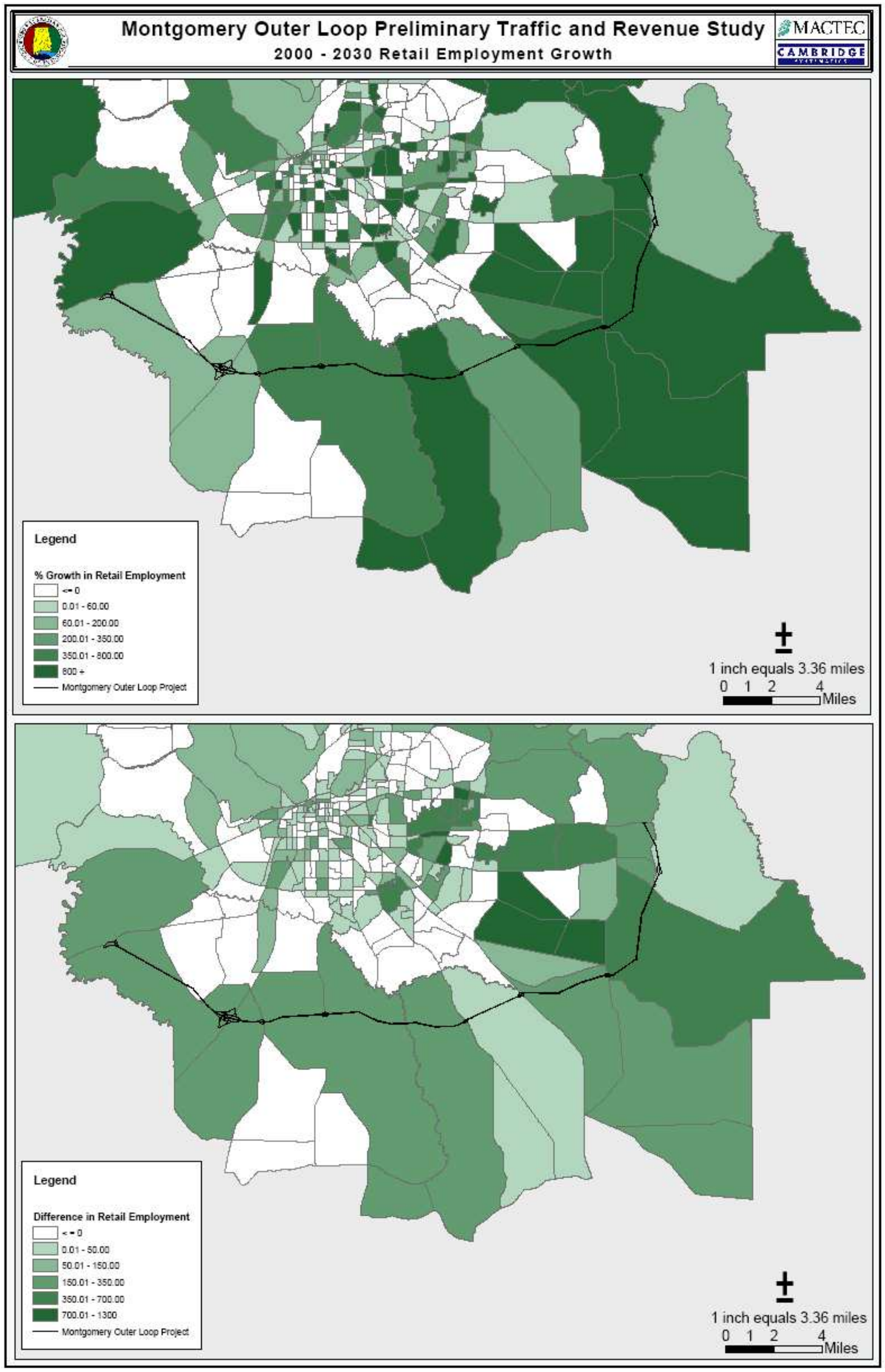
Figure 4.13 displays the retail employment growth forecast from 2000 to 2030. Retail employment growth is usually located in areas to support residential growth and is the case for Montgomery. The future growth retail is found to be in the same geographical locations at the household growth, and in particular, along the southeast portion of the outer loop corridor.

Figure 4.12 Household Growth Forecast



Source: Montgomery Area MPO Travel Demand Model; map prepared by Cambridge Systematics.

Figure 4.13 Retail Employment Growth Forecast



Source: Montgomery Area MPO Travel Demand Model; map prepared by Cambridge Systematics.

Non-retail employment growth (see Figure 4.14) such as government services and industrial type jobs are assumed to continue to locate downtown, as well as in locations around the new Hyundai plant and the Montgomery Regional Airport.

Growth in school enrollment is forecasted to occur at its highest near the termini of the outer loop project Figure 4.15). Most of the growth in enrollment is forecasted to occur north of the Outer Loop boundary.

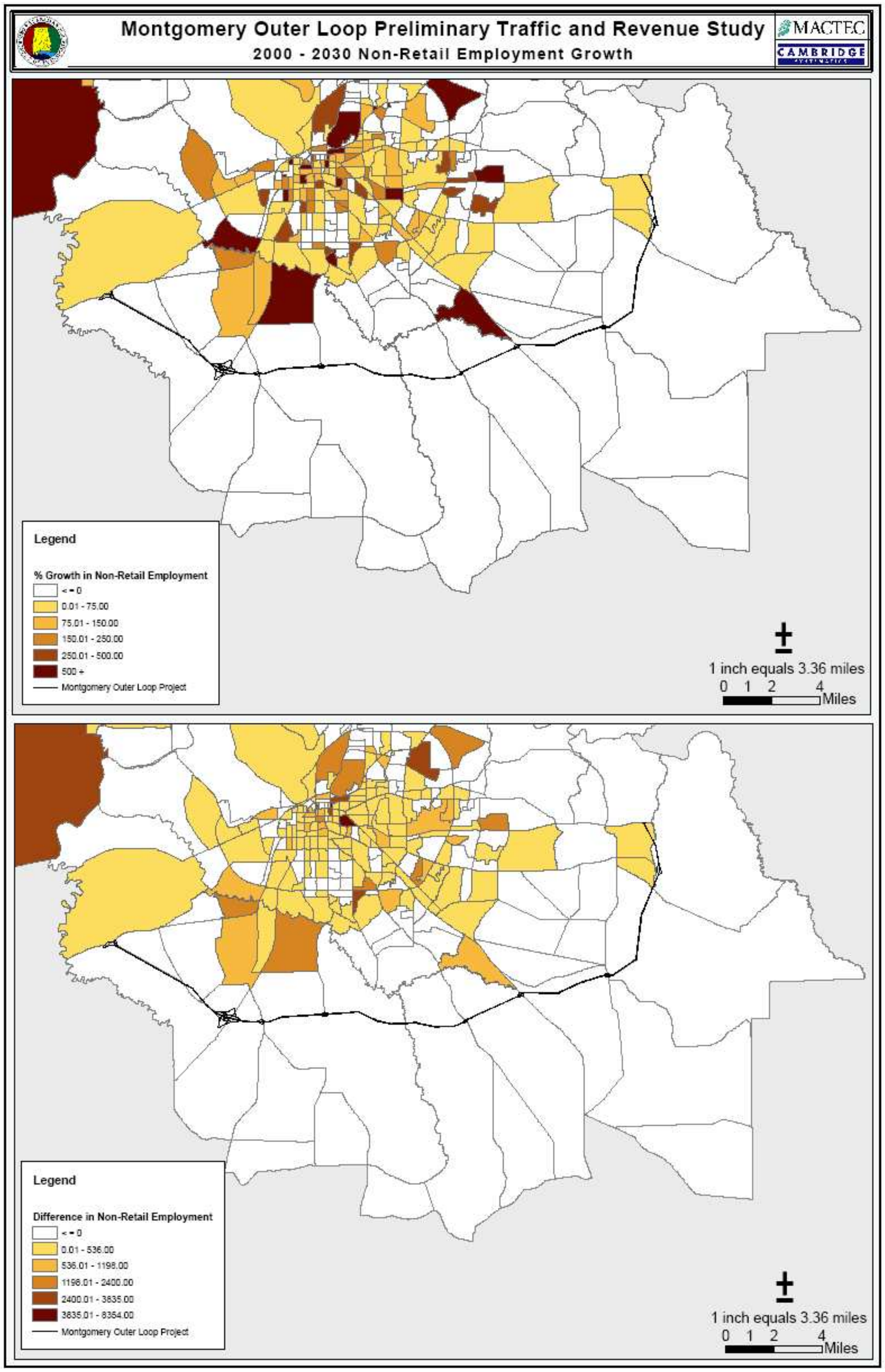
Table 4.2 shows the actual numbers that are included in the Montgomery travel demand model. The modeled area includes Montgomery County and most of Autauga and Elmore Counties.

Table 4.2 Montgomery Regional Travel Model – Socioeconomic Data

	Households	Retail Employment	Non-Retail Employment	School Enrollment
Year 2000	111,793	32,715	164,083	84,229
Year 2030	161,437	44,949	219,424	114,624
Growth	49,644	12,234	55,341	30,395
AAPC	1.2%	1.1%	1.0%	1.0%

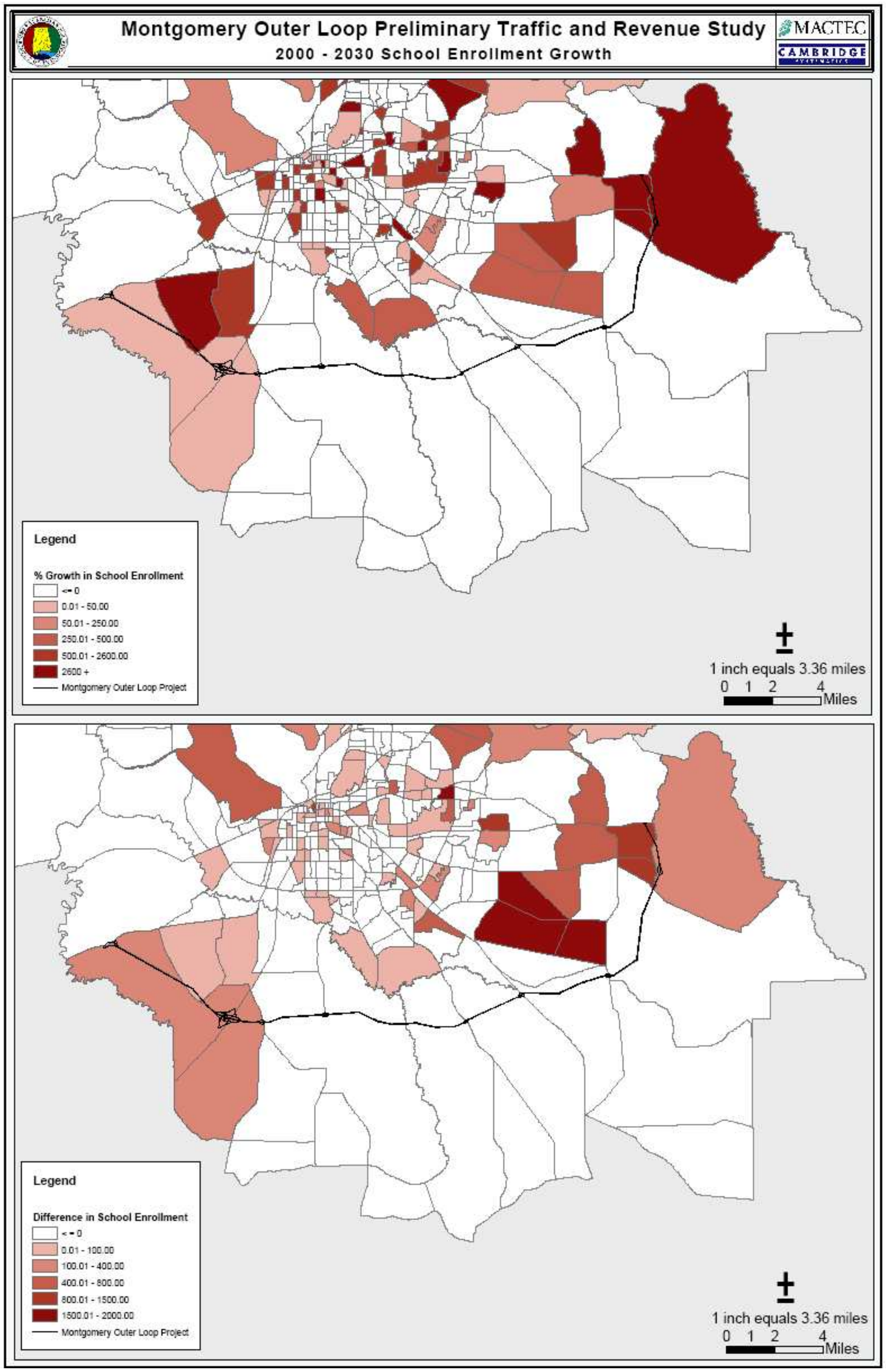
Source: Montgomery MPO – Regional Model Socioeconomic Dataset.

Figure 4.14 Non-Retail Employment Growth Forecast



Source: Montgomery Area MPO Travel Demand Model; map prepared by Cambridge Systematics.

Figure 4.15 School Enrollment Growth Forecast



Source: Montgomery Area MPO Travel Demand Model; map prepared by Cambridge Systematics.

5.0 Model Development

5.1 2000 Base Year Modification

The Montgomery regional travel demand model used for the 2030 Long-Range Transportation Plan (LRTP) was the starting point for analysis of the Outer Loop project. The LRTP included an outer beltway alignment in the 2030 Cost Feasible Plan network and in the 2010 Existing-plus-Committed (E+C) network.

Modification of the base year and future year scenarios began with the disaggregation of 11 traffic analysis zones (TAZs) along the Outer Loop alignment. Socioeconomic data for these zones were split using InfoUSA employment data and 2000 U.S. Census Household data. The number of internal zones and centroids was increased to 380 (from 360), yet the external stations remained as zones 381-419.

In addition to TAZ disaggregation, the assignment group variable was changed on Taylor Road upgrading the facility to a principal arterial, and the new zonal centroids were connected to the network as appropriate in both the base and future year scenarios.

Model Revalidation

The base year model was revalidated through a series of seven model runs aimed at improving model performance near the Outer Loop corridor. These runs included adjustments to TAZs, centroid locations, free flow time, and correction of coding errors and anomalies inherent in the base year 2000 highway network.

The initial model run, received from the MPO's Consultant, resulted in a root mean squared error (RMSE) of 40.73 percent and an overall volume/count (V/C) ratio of 1.05. The final base year validated network (Run 7) has an RMSE of 35.53 percent and a V/C ratio of 0.99. The following is a chronology of the base year 2000 model runs conducted by the Montgomery Outer Loop Project Consultant team as part of model revalidation.

Run 1 – TAZ splits were made in the area of study, as depicted in Figure 5.1; centroids were added and connected to the existing road network as appropriate; and the assignment group was upgraded to principal arterial 3) for Taylor Road. The overall V/C was reduced to 1.04 for Run 1 of the base year network.

Run 2 – Additional TAZ splits were made, centroid locations were adjusted; external trips were adjusted to match counts; and a turn penalty file was added.

Run 2b – Additional centroid connector adjustments were made. The overall V/C remained at 1.04 for Run 2b of the base year network.

Run 3 – A post processing script was written in TP+ format and used to convert the loaded network from TRANPLAN format in order to summarize RSME, V/C, congested speeds and other validation statistics; free flow times were decreased on principal arterials; the turn penalty was adjusted; and external trips were adjusted. The overall V/C ratio was 1.04 for Run 3 of the base year model, and RMSE was 41.64 percent.

Run 4 – Some centroids and connectors were moved.

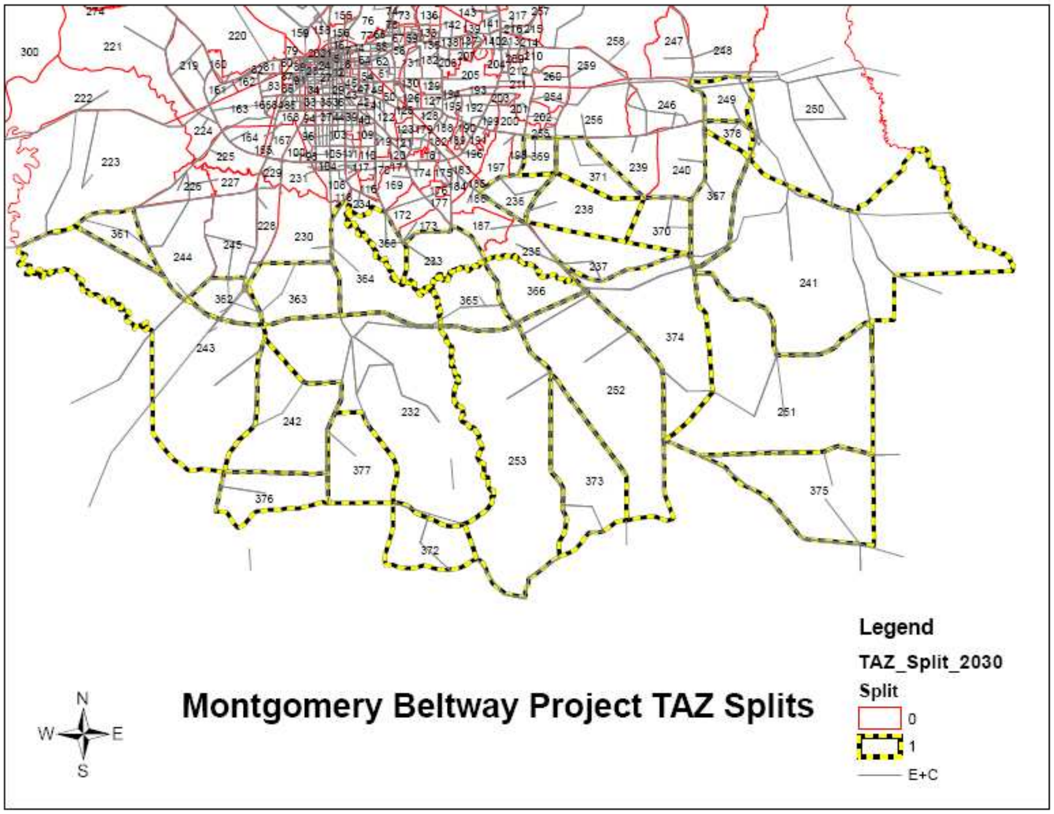
Run 4b – Screenlines were added; interstate coding errors were fixed; speed errors were fixed; free flow time adjustments were made; and the post processing script was modified. The overall V/C ratio was 1.02 for Run 4b of the base year model and the RMSE was 41.48 percent.

Run 5 – Free flow time adjustments were made; centroid adjustments were made; and TIME1 values were recalculated based on speed and distance changes. The overall V/C ratio was 1.03 for Run 5 of the base year network, and RMSE was 42.19 percent.

Run 6 – Free flow time adjustments and centroid adjustments were made. The overall V/C ratio was 1.01 for Run 6 of the base year network, and RMSE was 41.12 percent.

Run 7 – Base year and future year SE data (Retail and Non-Retail Employment) input file error was corrected per guidance from MPO staff; external trips were modified; centroids were moved; and free flow time adjustments were made. The overall V/C ratio was 0.99 for Run 7 of the base year network, and RMSE was 36.52 percent.

Figure 5.1 Final Revised TAZ structure



5.2 TOLL MODEL DEVELOPMENT

The TRANPLAN toll diversion model estimates the percentage of traffic that would use a toll road based on the travel times of both the toll and non-toll route and the out-of-pocket cost of the toll. Both electronic toll collection (ETC) and barrier toll collection scenarios were simulated.

6.0 Traffic and Revenue Analysis

6.1 Toll Free Traffic Estimates

The first step to evaluating the traffic and revenue of the proposed Outer Loop project was to estimate traffic under toll free conditions. Highway networks were developed to represent potential 2015 and 2030 conditions, based on the assumptions described in Section 2. Estimates of socioeconomic factors for these two years were also developed. In order to get an estimate of the level of growth that is assumed in the corridor we also ran the model using the year 2000 base year trip table on the 2015 network. In projects such as this one that are relying on future growth in the corridor, this serves as a basis to quantify that dependence.

Shown below are toll free estimates 2000, 2015, and 2030. Because there are significant improvements planned in the study area which are reflected in the cost feasible 2030 network, several highway network scenarios were tested for 2030 to show their impact on the proposed Outer Loop Project as a toll facility.

Figure 6.1 shows the results of running the year 2000 trip table on the 2015 build network wit the outer loop project under toll-free conditions. This is, in a sense showing estimates of volumes had the road been open in 2000. On an average weekday, it is estimated there would have been 21,400 trips using the highway with the highest volume of 12,000 vehicles shown at the eastern terminus of the project between SR 110 and I-85.

Figure 6.1 Year 2000 Trip Table on Year 2015 Build Network

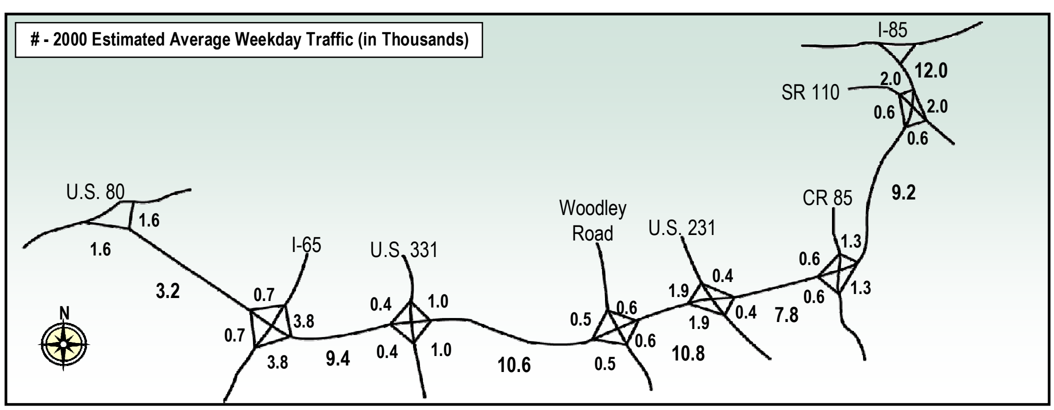


Figure 6.2 shows estimates of traffic on the Outer Loop in 2015 under toll-free conditions. On an average weekday, we estimate 42,200 would use the road with the highest volume of 23,200 vehicles shown between Woodley Road and U.S.

231. Trips are defined as vehicles entering the facility and are calculated by adding all entrance ramp volumes together. By comparison to the year 2000 volumes, future growth in the study area is expected to double the amount of traffic on the project between 2000 and 2015. This is 4.6 percent growth each year over these 15 years.

This is a significant amount of growth, and is an important risk factor to consider when considering a toll facility that might be supported entirely with toll revenue. There have been numerous instances of similar projects around the country in high-growth areas where expected future growth did not materialize and traffic and revenue was well below forecast.

This is not to be said that this forecast of development is overly aggressive, but a more detailed study and forecast of the region's economics would need to be performed particularly along the project corridor in an investment grade study. This would be viewed as the most important component of that study, since any degree of feasibility will undoubtedly be dependent on determining the extent to which the corridor will develop when the project is built. The care and detail of this task will also help address some of the concerns that the financial community would have with regard to a project that is highly dependent upon growth.

Figure 6.2 Year 2015 Estimated Toll Free Average Weekday Traffic

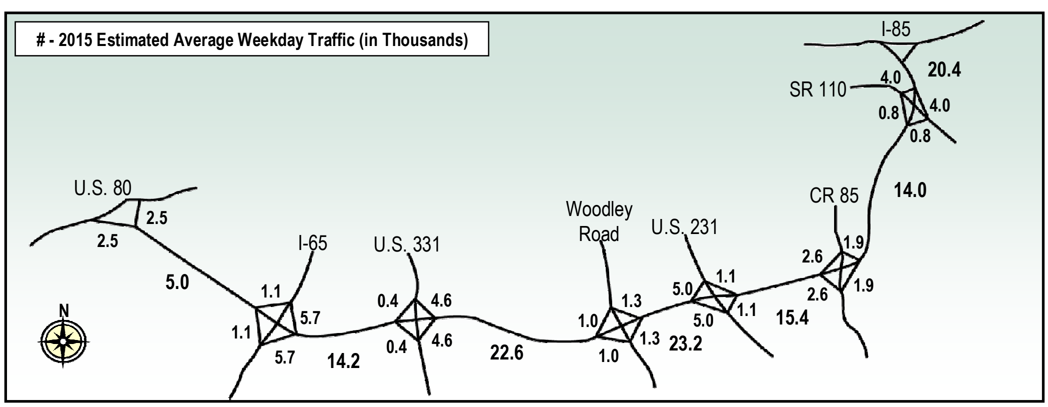


Figure 6.3 shows estimates of the 2030 toll free condition using the 2030 cost feasible network that has all planned highway improvements anticipated to be completed by 2030. There are significant planned improvements that would compete with the proposed Outer Loop. To understand the implications of the competing highway improvements on Outer Loop travel demand, we assigned the estimates 2030 travel patterns to the 2015 highway network.

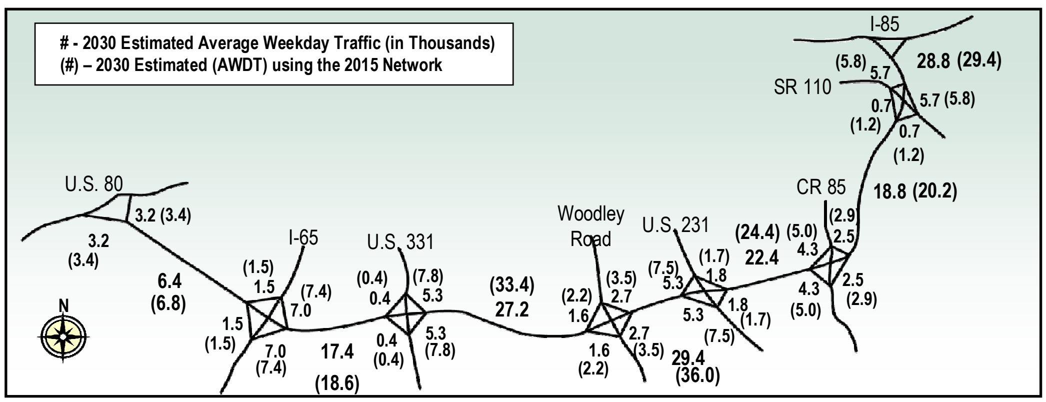
In 2030, we estimate 56,400 trips would use the Outer Loop on an average weekday, reflecting an overall growth of 14,200 trips or about 2.0 percent annually from 2015. Also shown in Figure 6.3 in parenthesis are the 2030 traffic estimates if the network was to remain as it was in the year 2015. The number of trips expected on an average weekday would be 65,000, an additional 8,600 trips.

This represents 37.7 percent of the traffic growth that might otherwise have occurred on the Outer Loop from 2015 to 2030 had there been no improvements.

We also evaluated the impact of removing the inner beltway improvements but keeping all other future planned improvements. The number of trips estimated under that scenario is 60,600, indicating that more than half of the trips lost due to highway improvements were directly related to the planned inner beltway improvements.

Like the growth assumptions, future change to the highway network is key component that needs to be taken into consideration when determining the feasibility of a toll project.

Figure 6.3 Year 2030 Estimated Toll Free Average Weekday Traffic



6.2 TOLL CONFIGURATION AND PHASING

Traditional toll roads have employed toll booths with toll collectors and manned or unmanned coin machines. Over the last decade or so, there have been significant advances in toll technology which streamlines toll collection through electronic means. There are some new toll roads in the world that employ no toll collectors at all, although most facilities still have a mixture of electronic and attended methods. In some regions of the country with a lot of toll facilities (e.g., Texas), many new toll roads are being built without toll attendants.

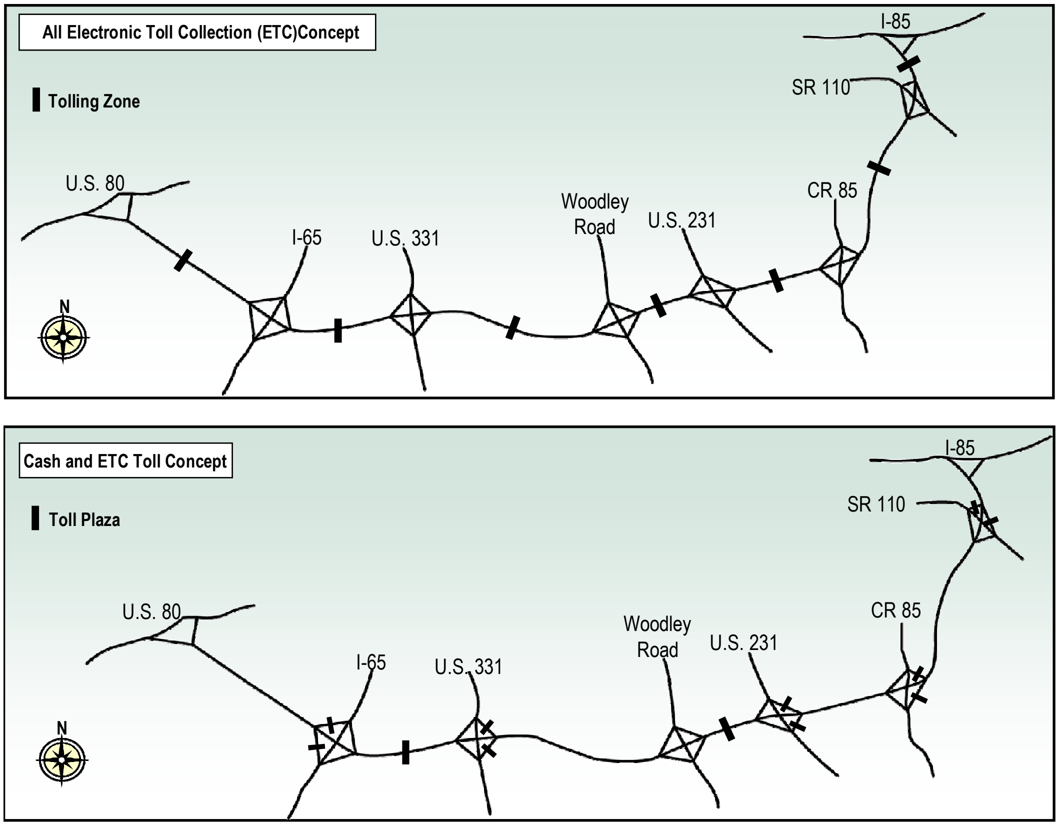
All-electronic tolling opens up new opportunities for toll systems. Typically, urban toll roads have used mainline and ramp toll plazas that charge a flat rate regardless of actual distance traveled. This is cost-effective, but results in significant inequities in the amount of toll paid for different length trips. Also, vehicles must come to a stop to pay the toll. With electronic toll collection, trips can be charged for the actual distance traveled on the toll road by reading the entry and exit points of each vehicle, and charging accordingly. And, tolls can be collected at full highway speeds. The downside of such systems is that it requires all vehicles to be registered account holders, and people that are not registered may not use the road. This has the effect of reducing the potential market share due to people choosing to not obtain a transponder for one reason or another. There are not any other toll facilities in the general area so penetrating the market with this technology would take time. Therefore, on a system that will likely need all it can get in terms of toll revenue this may not be the best choice for this particular project.

Some facilities offer a video component to their toll collection which allows people without a transponder to gain access to the facility. A driver's license plate is captured on tape and a bill which includes the original toll cost and an additional toll surcharge is mailed out to the user. The surcharge is needed to cover the additional expense of processing these records. Although attractive to the customers, these systems are expensive to run, and the surcharge is usually quite high to cover the cost of processing this payment option.

For these reasons the tolling configuration of the project was analyzed under two options; one as an all electronic toll collection (ETC) system and the other being a traditional barrier toll system that would accommodate both electronic and cash payment types.

Figure 6.4 shows the electronic and barrier toll configurations that were used in this preliminary analysis. Tolling locations under the all electronic scheme (the top diagram) would be located between each interchange and rates would be charged on a pure per mile basis. The barrier tolling configuration would be comprised of two mainline tolling locations with ramp toll plazas at all but one of the interchanges (the bottom diagram). The barrier system was set up to try to minimize the number of times one pays. Ideally, you would prefer an individual to have to pay only once. This is beneficial not only to the customer, but also will reduce the number of transactions and therefore operating costs. The barrier tolling configuration would accommodate both electronic and cash toll payment methods.

Figure 6.4 Electronic and Cash/ETC Barrier Tolling Concepts



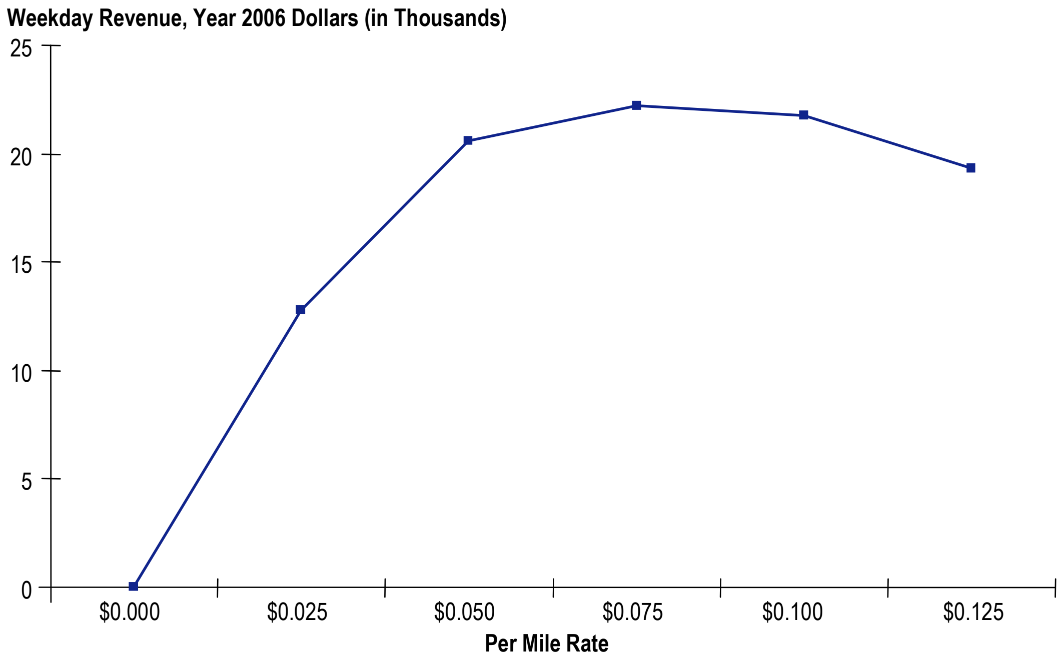
6.3 Toll Rate Sensitivity Analysis

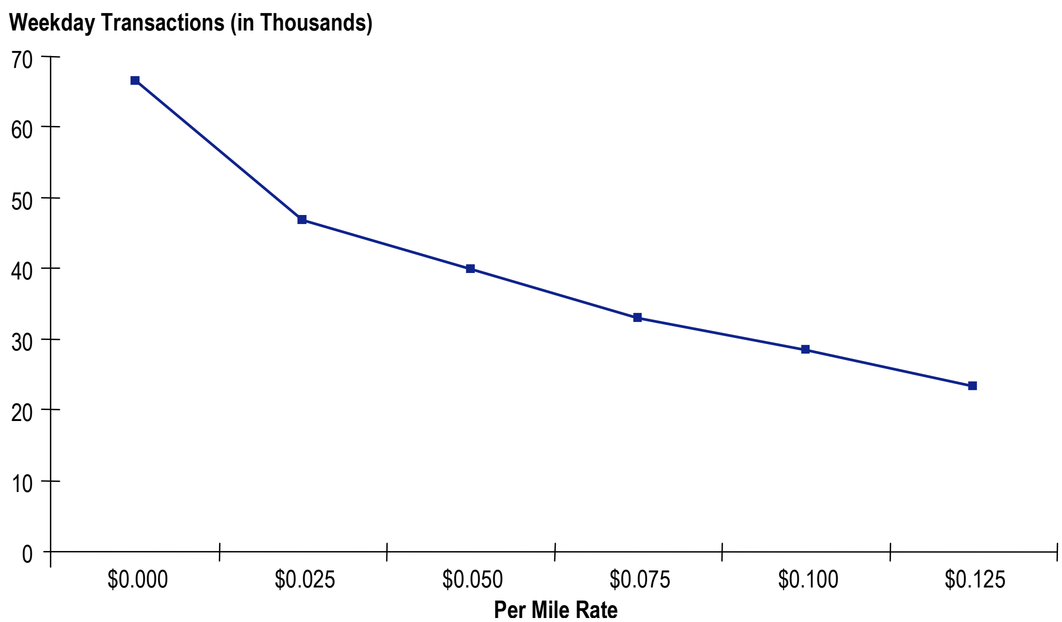
The next step in the analysis was to evaluate how drivers would be expected to react to different levels of toll. We evaluated this using the electronic-only toll collection configuration using toll rates ranging from $0.025 to $0.125 per mile. These rates are at the lower end of rates typically charged for modern urban toll roads, which can be as high as $0.20 per mile and higher.

Two networks were used for the toll sensitivity analysis. One network consisted of all existing plus committed (E+C) highway improvements and the other was the full-cost feasible network with all planned highway improvements by 2030. Since the E+C network is at the lower-level of improvements that are likely to occur in the area and the full-cost feasible network is at the highest-level, these networks represent the spectrum of improvements that are likely to occur over the next 25 years or so.

Figure 6.5 shows the estimated reaction of drivers to tolls on the Outer Loop project for the E+C network. The top curve shows estimated average weekday revenue versus the per mile toll rates tested. The bottom curve shows the corresponding estimated average weekday transactions that would be expected to occur at each per mile toll rate.

Figure 6.5 2030 Toll Sensitivity Curves – Existing-plus-Committed Network



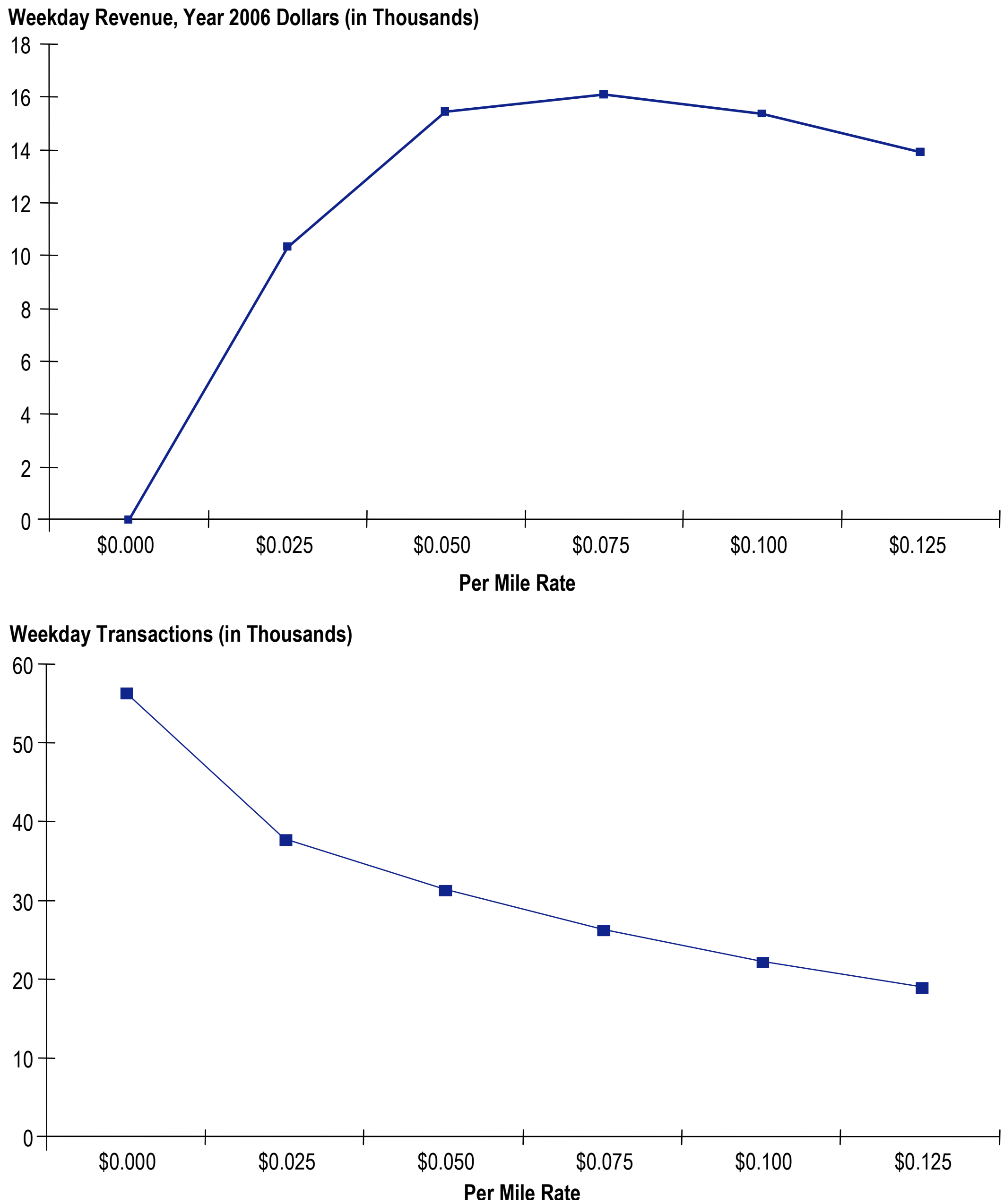


The revenue-maximizing toll rate is in the range of $0.05 to $0.075 per mile. Although this is on the low end of typical new toll roads being built, it must be viewed in the context of competing facilities and measures of willingness to pay.

Other projects of this kind in recent years have not been able to meet their projections and one of the factors may be the implementation of tolls that are beyond that willingness to pay. This project as it was studied is a development project; meaning growth along the project corridor will be the driving force behind the project's usage. The proximity of Interstates 65 and 85 mean that through movements that do not have origins or destinations within close proximity of the ends of the corridor will be will have relatively low time savings compared to the toll, meaning that many people that would use the Outer Loop if it were free would not use it if it had higher tolls. The bottom curve displays the estimated transactions at different toll rates. At the $0.05 per mile rate, about 60 percent of the initial demand would be expected to be retained by the facility.

Figure 6.6 displays the toll sensitivity curves for the Cost Feasible network. The same conclusions mentioned above can be drawn from these set of curves. Since the cost feasible network has many more competing improvements including those on the inner beltway, the optimal toll rate range upper limit is pushed back from the $0.075 upper limit as compared to the results of the E+C runs. Toll free transactions are about 15 percent less than those estimated under the E+C network due to the impacts of the competing improvements.

Figure 6.6 2030 Toll Sensitivity Curves – Cost Feasible Network



Under a $0.05 per mile toll rate the difference between transactions under the E+C network and the cost feasible network is about 20 percent. Under a toll free condition this difference is about 15 percent which is directly due to the differences between the two networks. The additional 5 percent impact (the difference between the 20 percent and 15 percent) under the $0.05 per mile toll rate is the result of the project being less competitive due to the further network improvements. Therefore, at identical per mile rates, the cost feasible network will have higher diversion rates than the E+C network due to the competing facilities that are planned for construction.

6.4 ESTIMATED AVERAGE WEEKDAY TRAFFIC

An interim meeting was held with ALDOT staff upon completion of multiple runs for the interim year 2015 and future year 2030. At the conclusion of that meeting it was decided that the barrier tolling configuration would be used for further analysis. It was also decided to set a minimum toll of $0.50 since tolls much below that are expensive to collect compared to the revenue received. In addition, several suggestions for additional scenarios were made. The remaining portion of this document focuses on these variations of the project, estimates of their traffic and revenue potential and an assessment of the feasibility of the project.

Cost Feasible Network

A final set of runs was performed after the interim meeting using the tolls displayed in Figure 6.7. A through trip would pay $1.50, or about $0.05 over the nearly 30-mile project. Shorter trips would generally pay more per mile. Trucks would pay higher rates; assumed to be 1.5 and 2.5 times the passenger vehicle rate for light and heavy commercial vehicles, respectively.

Figure 6.7 Passenger Car Toll Rates (2006)

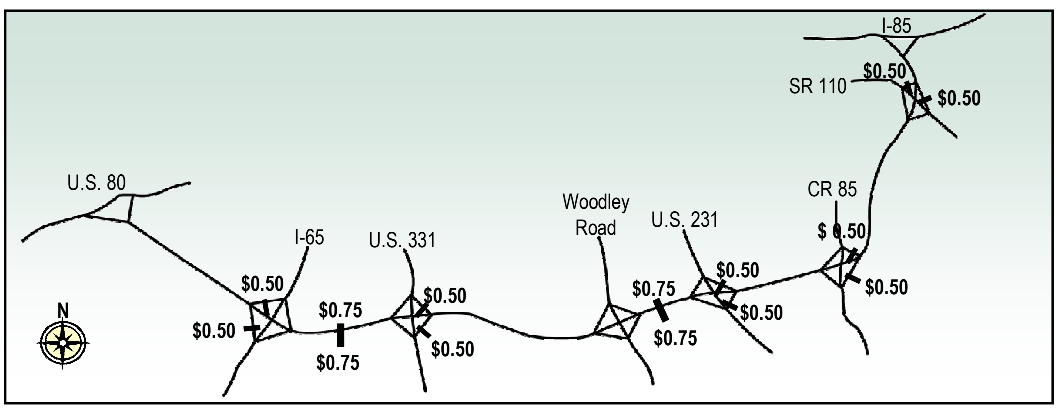
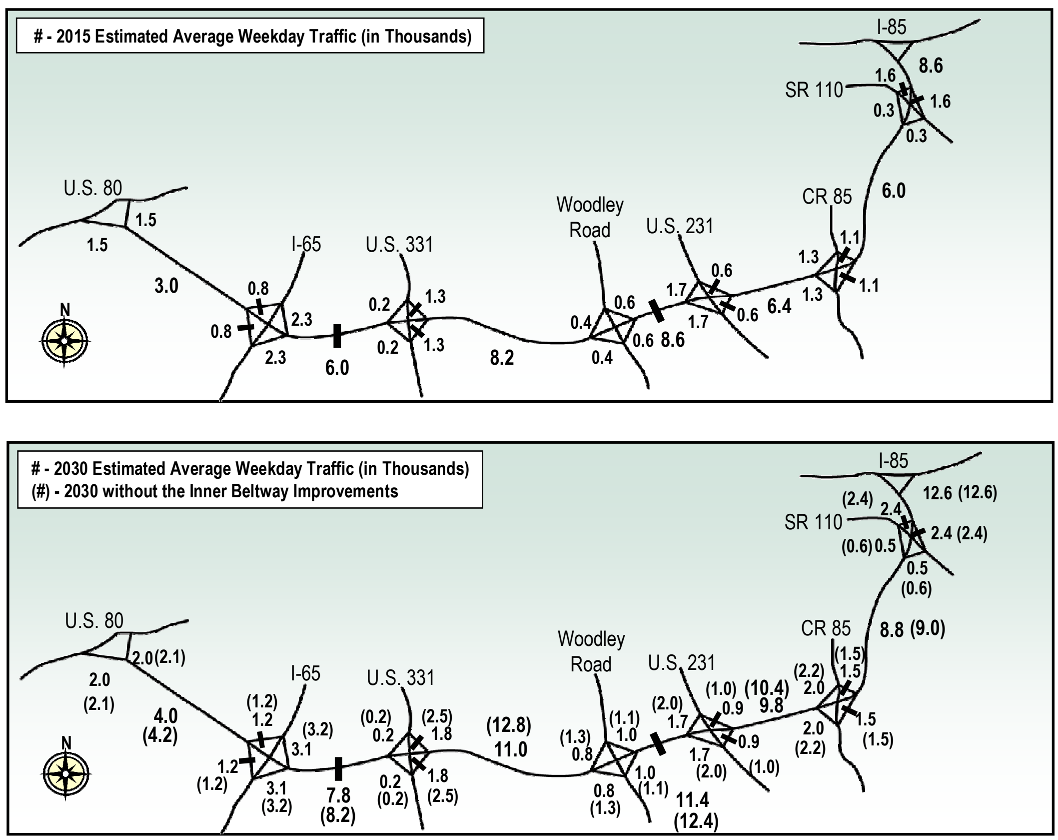


Figure 6.8 shows the 2015 and 2030 estimated average weekday traffic using the indicated toll rates. In 2015, we estimate 18,000 trips to use the Outer Loop on an average weekday, with an estimated 25,400 toll transactions. This means that each trip makes an average of 1.41 transactions along their trip. Since two transactions is the highest number a trip can make because of the toll configuration, we calculate that 41 percent of the trips are required to make two transactions and the remaining 59 percent are making one transaction. The estimated vehicle miles traveled on the project is 183,866 with an average trip length on the project of 10.2 miles. The highest volume of 8,600 vehicles is

estimated to occur between Woodley Road and U.S. 231 at the mainline plaza and at the east end of the facility. The lowest mainline volume is shown to be at the west end of the facility between I-80 and I-65. Later on in the discussion we will show the results of leaving this segment out of the analysis.

Figure 6.8 Estimated Average Weekday Traffic – Cost Feasible Network at about $0.05 per mile with barrier tolls



By 2030, average weekday traffic on the facility is estimated to be 25,400 vehicles making 34,800 transactions. The average number of transactions per trip is down slightly to 1.37. Vehicle miles traveled along the facility is calculated to be 255,708 with an average trip length of 10.1 miles. The average annual percent change in trips from 2015 to 2030 is 2.3 percent. This growth rate is dampened due to the impact of the highway improvements in the study area during the 2015 to 2030 period. The highest volume of 12,600 vehicles is estimated to occur at the east end of the facility.

The numbers shown in parenthesis in the 2030 schematic are reflective of the scenario where the inner beltway improvement would not occur. The number of trips estimated to be on the facility is 27,600, an increase of about 8.7 percent. This increases the average annual growth on the facility to 2.9 percent between 2015 to 2030. The estimated number of transactions would increase to 37,800 on an average weekday, an increase of 3,000.

Alternative Scenario: West Terminus of Project at I-65

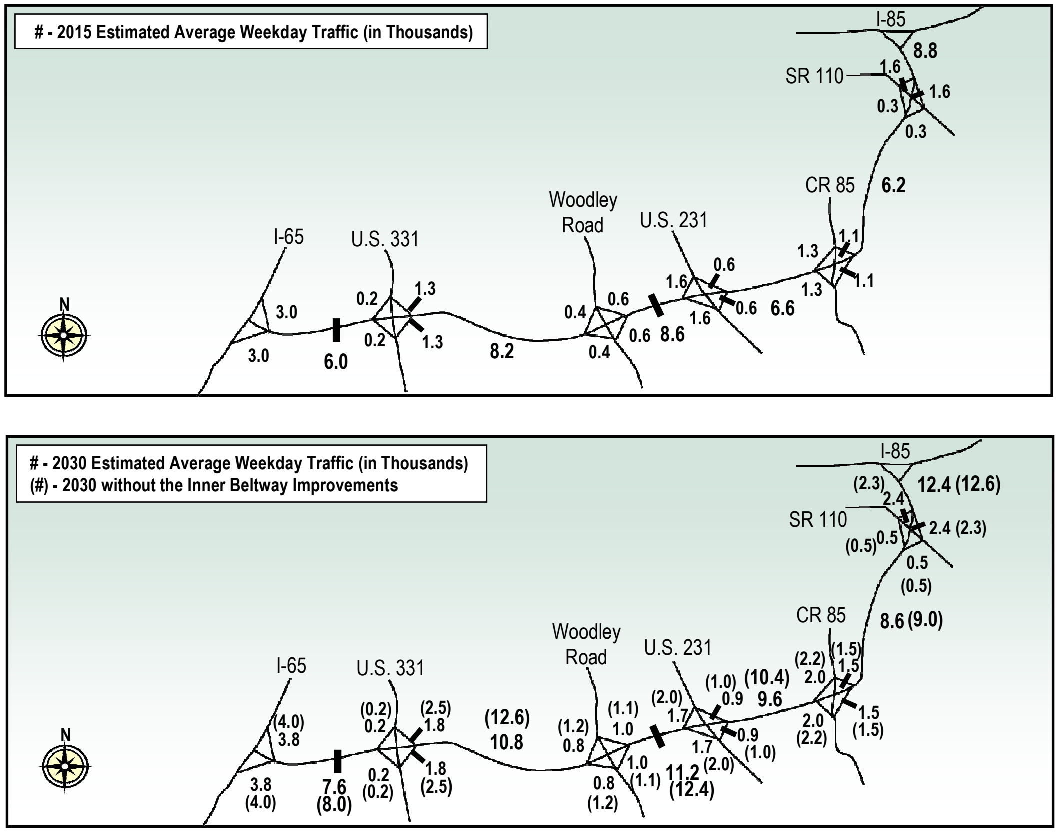
We also analyzed the implications of an alternative project configuration with the west end of the facility terminating at I-65, given the low traffic volumes forecasted in the section between I-80 and I-65. The only two changes in the toll configuration was the removal of the toll ramps to and from the west at I-65 due to the west segment being removed and the reduction of the mainline toll between I-65 and U.S. 331 to $0.50, to reflect the reduced length of the project by 5.6 miles.

Figure 6.9 shows the estimated volumes for this scenario for 2015 and 2030. We forecast 16,400 trips on an average weekday for the year 2015 under this configuration. This is 1,600 less trips on an average weekday as compared to the full project scenario. This number is a little deceiving in that there were 3,000 trips on the extension that were removed from this scenario with 1,600 of those on the ramps to and from the west at the I-65 interchange. Therefore, we would expect to be losing something more than 1,600 trips by removal of these ramps. As it looks, all of the additional 1,400 trips that were expected to use the I-80 interchange seem to have moved to the I-65 ramps to and from the east. Some of this is indeed happening, but since we have a lower toll of $0.50 at the mainline plaza between I-65 and U.S. 331 under this scenario, we are also capturing more of the I-65 demand than under the full project condition. The point is that the estimated impacts are a result of a physical difference in the project, as well as a toll cost reduction for those movements passing through the west mainline plaza. The number of transactions is estimated to be 23,800 on average weekday. Although we see a reduction of only 6.3 percent on transactions due to the removal of this segment, a slightly larger revenue impact will be shown due to the lower mainline toll.

By 2030, estimated average weekday traffic on the facility is 22,800 vehicles making 32,000 transactions. As compared to the full project, average weekday trips and transactions are reduced by 2,600 and 2,800, respectively. This translates into an 8.0 percent reduction on transactions. Again, there will be a slightly larger reduction on revenue due to the toll cost reduction for those movements passing through the mainline plaza east of I-65.

The numbers shown in parenthesis in the 2030 schematic are reflective of the scenario where the inner beltway improvement would not occur. The number of trips estimated to be on the facility is 24,800, an increase of about 8.8 percent. This increases the average annual growth on the facility from 2.2 to 2.8 percent between 2015 to 2030. The estimated number of transactions would increase to 35,000 on an average weekday, an increase of 3,000.

Figure 6.9 Estimated Average Weekday Traffic – I-65 West Terminus

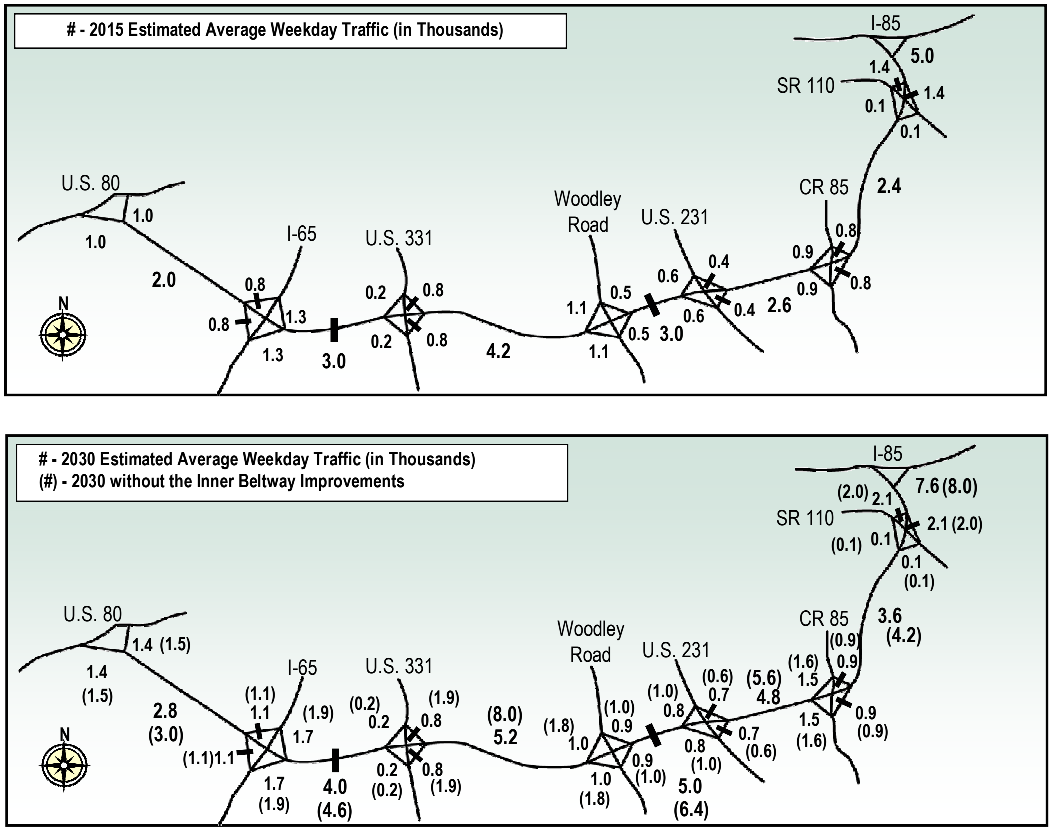


Alternative Scenario: Two-Lane Facility

Another scenario that was analyzed was a two-lane expressway type facility. This option was evaluated as it would be less costly to construct and the estimated traffic demand could be accommodated by a two-lane facility. This is an approach to toll roads that has been sometimes used in Florida where much of the traffic is expected to come from future growth. Average speeds were assumed to be significantly lower than the full-build alternative resulting in lower travel time savings over alternative routes. For that reason, all tolls were set at $0.50. A through trip would have a total toll of $1.00 as compared to the $1.50 under the full build project.

Figure 6.10 shows the 2015 and 2030 estimated average weekday traffic under the two-lane scenario. In 2015, there is estimated to be 12,400 trips on an average weekday resulting in 14,400 transactions. By 2030, the number of trips would be expected to increase to 17,000 on an average weekday resulting in 20,200 transactions. The numbers shown in parenthesis in the 2030 schematic are reflective of the scenario where the inner beltway improvement would not occur. The number of trips estimated to use the Outer Loop under this network configuration is 19,600, an increase of 2,600 trips or about 15.3 percent over the configuration with the inner beltway improvements. The estimated number of transactions would increase to 24,000 on an average weekday, an increase of 3,800.

Figure 6.10 Estimated Average Weekday Traffic – Two-Lane Facility

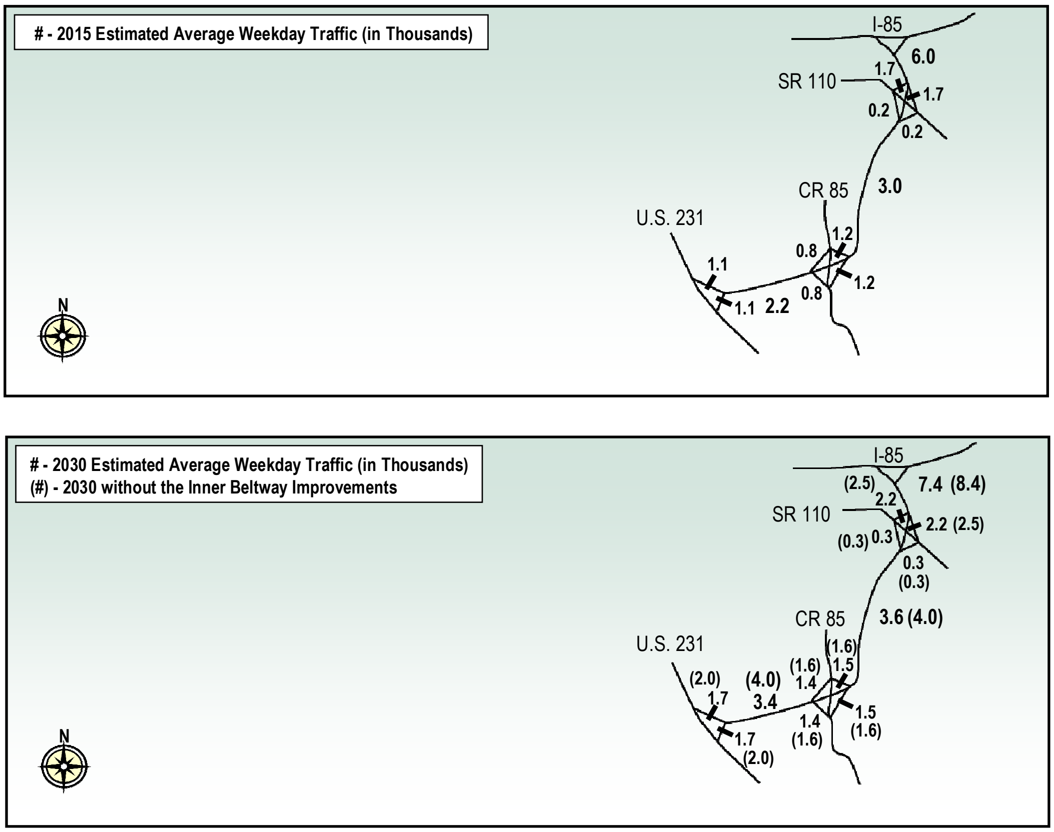


Alternative Scenario: Phase 1 Project

Because the project might be best built in phases, we looked at a configuration where only the east portion of the facility was built. This segment of the facility is viewed as the most logical starting point for construction and would serve the growing housing population that is occurring in this quadrant of Montgomery. This initial project would be about 11 miles long and would begin at U.S. 231 at the west end and end at I-85 at the east end. Ramp plazas with tolls of $0.50 would be located to and from the east at U.S. 231, CR 85, and SR 110. These are the same toll locations, as well as rates, that are in the full project, meaning any future expansion of the facility would not impact the toll configuration of this first phase.

Estimates of 2015 and 2030 usage were prepared and are shown in Figure 6.11. In 2015, we estimate that 8,000 trips would use the shorter project on an average weekday, forecasted to increase to 10,800 trips by 2030. This is an increase of about 2.0 percent annually. As with the other scenarios, the inner beltway improvements scheduled to take place between 2016 and 2030 were removed from the 2030 network and the analysis was repeated. Average weekday transactions would be expected to increase to 12,200, about 13 percent higher than those under the condition with all planned 2030 improvements. The annual percent growth between 2015 and 2030 is 2.9 percent under this scenario.

Figure 6.11 Estimated Average Weekday Traffic – Phase 1 Project



6.5 ESTIMATED TOLL REVENUE

Estimated average weekday transactions at each tolling location were multiplied by the average toll rate for each plaza for 2015 and 2030, and for each scenario. Annual estimates revenue were then developed by assuming 250 typical weekdays and 115 weekend/holidays in a given year. A weekend day was assumed to carry 50 percent of the traffic estimated on an average weekday. All revenues shown are in year 2006 dollars.

Annual Revenue

Table 6.1 shows the average weekday transactions, average toll rates, and resulting annual estimates of toll transactions and toll revenue. The Full Project is estimate to produce $5.9 million in gross toll revenue in 2015, increasing to $8.0 million by 2030. Without the inner beltway improvement, annual revenue is estimated to be $8.6 million by 2030.

Note that these revenue estimates are all in 2006 dollars, as are the toll rates used. This means that we would expect the toll rates to generally track inflation, and that the actual dollars collected would be more. The implications of this assumption are described in more detail in the financial analysis.

With a slightly shorter project terminating at I-65 at the west end, annual revenue is estimated to be $5.0 million in 2015, increasing to $6.7 million by 2030. Without the inner beltway improvement, annual revenue is estimated to be $7.4 million. Depending on the year of forecast, the reduction in revenue ranges from 14 and 16 percent as compared to the full project. The hope would be that the reduction in construction costs due to not building the ramps to and from the west at I-65, or the ramps to and from the east at I-80, and the 5.6-mile segment between these two interchanges outweighs this reduction in revenue.

The two-lane project scenario is estimated to result in $2.5 million in 2015, increasing to $3.6 million by 2030. Without the inner beltway improvement, 2030 annual revenue is estimated at $4.2 million. This two-lane facility is estimated to produce between 42 and 49 percent of the full project revenue.

The Phase I Project which would extend for about 11.0 miles from I-85 at the east end to U.S. 231 at the west end is estimated to produce annual revenue of $1.4 million in 2015, increasing to $1.8 million by 2030. Without the inner beltway improvements, 2030 revenue is estimated to be $2.1 million.

Table 6.1 Estimated Transactions and Toll Revenue

Full Project	Year 2015			Year 2030			Year 2030 without Inner Beltway Improvements		
	Average Weekday			Average Weekday			Average Weekday		
Toll Plaza	Transactions	Avg. Toll	Revenue	Transactions	Avg. Toll	Revenue	Transactions	Avg. Toll	Revenue
I-65	1,600	$0.60	$960	2,400	$0.60	$1,440	2,400	$0.60	$1,440
Mainline	6,000	$0.90	$5,400	7,800	$0.90	$7,020	8,200	$0.90	$7,380
US 331	2,600	$0.55	$1,430	3,600	$0.55	$1,980	5,000	$0.55	$2,750
Mainline	8,600	$0.90	$7,740	11,400	$0.90	$10,260	12,400	$0.90	$11,160
US 231	1,200	$0.60	$720	1,800	$0.60	$1,080	2,000	$0.60	$1,200
CR 85	2,200	$0.53	$1,166	3,000	$0.53	$1,590	3,000	$0.53	$1,590
SR 110	3,200	$0.53	$1,696	4,800	$0.53	$2,544	4,800	$0.53	$2,544
Total Weekday	25,400		$19,112	34,800		$25,914	37,800		$28,064
Total Annual	7,810,500		$5,876,940	10,701,000		$7,968,555	11,623,500		$8,629,680

I-65 Terminus Project	Year 2015			Year 2030			Year 2030 without Inner Beltway Improvements		
	Average Weekday			Average Weekday			Average Weekday		
Toll Plaza	Transactions	Avg. Toll	Revenue	Transactions	Avg. Toll	Revenue	Transactions	Avg. Toll	Revenue
Mainline	6,000	$0.60	$3,600	7,600	$0.60	$4,560	8,000	$0.60	$4,800
US 331	2,600	$0.55	$1,430	3,600	$0.55	$1,980	5,000	$0.55	$2,750
Mainline	8,600	$0.90	$7,740	11,200	$0.90	$10,080	12,400	$0.90	$11,160
US 231	1,200	$0.60	$720	1,800	$0.60	$1,080	2,000	$0.60	$1,200
CR 85	2,200	$0.53	$1,166	3,000	$0.53	$1,590	3,000	$0.53	$1,590
SR 110	3,200	$0.53	$1,696	4,800	$0.53	$2,544	4,600	$0.53	$2,438
Total Weekday	23,800		$16,352	32,000		$21,834	35,000		$23,938
Total Annual	7,318,500		$5,028,240	9,840,000		$6,713,955	10,762,500		$7,360,935

Two-Lane Project	Year 2015			Year 2030			Year 2030 without Inner Beltway Improvements		
	Average Weekday			Average Weekday			Average Weekday		
Toll Plaza	Transactions	Avg. Toll	Revenue	Transactions	Avg. Toll	Revenue	Transactions	Avg. Toll	Revenue
I-65	1,600	$0.60	$960	2,200	$0.60	$1,320	2,200	$0.60	$1,320
Mainline	3,000	$0.60	$1,800	4,000	$0.60	$2,400	4,600	$0.60	$2,760
US 331	1,600	$0.55	$880	1,600	$0.55	$880	3,800	$0.55	$2,090
Mainline	3,000	$0.60	$1,800	5,000	$0.60	$3,000	6,400	$0.60	$3,840
US 231	800	$0.60	$480	1,400	$0.60	$840	1,200	$0.60	$720
CR 85	1,600	$0.53	$848	1,800	$0.53	$954	1,800	$0.53	$954
SR 110	2,800	$0.53	$1,484	4,200	$0.53	$2,226	4,000	$0.53	$2,120
Total Weekday	14,400		$8,252	20,200		$11,620	24,000		$13,804
Total Annual	4,428,000		$2,537,490	6,211,500		$3,573,150	7,380,000		$4,244,730

Phase I Project	Year 2015			Year 2030			Year 2030 without Inner Beltway Improvements		
	Average Weekday			Average Weekday			Average Weekday		
Toll Plaza	Transactions	Avg. Toll	Revenue	Transactions	Avg. Toll	Revenue	Transactions	Avg. Toll	Revenue
US 231	2,200	$0.60	$1,320	3,400	$0.60	$2,040	4,000	$0.60	$2,400
CR 85	2,400	$0.53	$1,272	3,000	$0.53	$1,590	3,200	$0.53	$1,696
SR 110	3,400	$0.53	$1,802	4,400	$0.53	$2,332	5,000	$0.53	$2,650
Total Weekday	8,000		$4,394	10,800		$5,962	12,200		$6,746
Total Annual	2,460,000		$1,351,155	3,321,000		$1,833,315	3,751,500		$2,074,395

Note: All Toll Revenue is in Year 2006 Dollars

Financial Analysis

We did a rudimentary analysis of how much capital cost tolls from each of the project configurations could support.

The financial elements of the analysis were brought together using a spreadsheet analysis which incorporates assumed inflation rates, debt service coverage, and bond interest rates with the 35-year net revenue stream for each project, resulting in an estimate of the amount of construction funds that might be generated for each scenario. Net revenue was calculated by subtracting out operating expenses for the facility. Annual operating expenses were calculated by multiplying annual transactions by a cost of $0.25 per transaction. Inflation related to toll revenue and costs were assumed to average 3.0 percent annually. Other assumptions used in the financial analysis reflective of a typical traditional toll revenue bond financing were a debt service coverage ratio of 1.75 and a bond interest rate of 5.4%. A 5.0% toll evasion was assumed to occur and was included in the financial analysis.

It is estimated that the full project configuration could contribute between $50.0 to $52.9 million (see Table 6.2) toward the construction of the facility. The slightly shorter project with a western terminus at I-65 could contribute between $40.2 and $43.0 million. The two-lane facility could contribute between $18.6 and $21.1 million while the Phase I project could contribute between $9.3 and $10.2 million toward construction costs.

Table 6.2 Estimated Funds for Construction

Scenario	Cost Feasible Network	Without Inner Beltway Improvements in 2030
Full Build	$50,000,000	$52,900,000
I-65 Terminus	$40,200,000	43,000,000
Two-Lane Facility	$18,600,000	$21,100,00
Phase I	$9,300,000	$10,200,000

Assumptions: Inflation 3.0%, Debt Service Coverage 1.75, Bond Rate 5.4%, Assumed toll evasion 5%.

We do not know the cost to build each of these scenarios, but understand that these values are well below that which would probably needed to build the project entirely with toll revenue using conventional finance approaches.

More and more toll projects today are being built with a mixture of funds from traditional sources and from toll revenue. Also, public private partnerships are being used in many states to advance projects that might not be feasible under traditional approaches. These public private partnerships take advantage of private equity where the equity partners are more patient in their need for return on their capital than traditional revenue bonds. Such projects do carry significant risk, and significant expertise on behalf of the State.